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NATURAL HISTORY OF IRELAND.

VOL. IV.

Jno Thompson

THE

NATURAL HISTORY

OF

IRELAND.

IN FOUR VOLUMES.

VOL. IV.

MAMMALIA, REPTILES, AND FISHES.

ALSO

INVERTEBRATA.

BY THE LATE

WM. THOMPSON, ESQ.,

PRESIDENT OF THE BELF. NAT. AND PHILOSOPHICAL SOCIETY OF BELFAST, HONORARY MEMBER OF THE NAT. HIST. SOCIETY OF DUBLIN, &c. &c.
OF THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA, ETC.

LONDON:
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PREFACE.

In the will of the late William Thompson, Esq., of Belfast, the following paragraph occurs :—

"In the event of my decease before the publication of my work on the Natural History of Ireland shall have been completed, it is my wish, and I hereby direct, that the entire of my manuscript relating thereto shall be handed over to Mr. Robert Patterson and Mr. James R. Garrett, both of Belfast, with a request that they will undertake the duties of superintending editors of same, in order that the whole may be carefully published."

Shortly after Mr. Thompson's death (February 17, 1852) his papers were, in conformity with these directions, delivered to my friend the late Mr. Garrett and myself.

On examining the mass of papers thus placed in our hands, we found those relating to the principal divisions of the animal kingdom carefully separated from each other, and the materials for each of the minor groups in separate covers. Within these, smaller envelopes were placed, each appropriated to one species. So far nothing could be more methodical or more complete—the families, genera, and species were arranged in regular sequence, and of course, any particular one could immediately be found.

But on opening one of these envelopes the idea of completeness was dissipated; instead of the building itself, there were only the materials with which it would have been constructed, had the life of the architect been spared to finish what he had so well begun. The envelopes contained notes made at various times, letters, or extracts from letters, references to his personal journals or to his published papers, to books, to scientific periodicals, or to the transactions of societies. In some instances there were also memoranda for his own guidance, with regard to fishes, indicating the manner in which he intended to treat the subject.

Here at the very outset a difficulty arose. The notes were written on paper of the most miscellaneous description; and occasionally on scraps so small that six or eight lines were crowded into a slip not exceeding an inch in breadth. To work with good effect on notes in such a state was impossible; nor was it safe to make the attempt, for the sudden opening of a door or window, if a table were covered with such scraps, might have involved the loss of some precious fragment that could never be replaced. We resolved, therefore, in the first instance, to have the entire of the memoranda relating to the vertebrate animals carefully transcribed and compared with the originals. This was done, and every scrap in Mr. Thompson's handwriting scrupulously preserved, so that, if needful at a future period, any one might be referred to.

The next step was to fix on some general plan of arrangement, so that the several topics might follow in regular order. For our guidance in this matter we had Mr. Thompson's "Birds of Ireland," and the memoranda already noticed with respect to some of the fishes. A certain course was accordingly planned by Mr. Garrett and myself; and meeting with the approval of our friends Dr. Dickie and Mr. Hyndman, was adopted.

We decided on making no change in such of the printed papers as we now republish, except where additional information had been acquired. We determined to give the facts, references, and descriptions in full, but to condense the enumeration of dates, names, localities, &c. It was obvious we might do our friend injustice by publishing too much, as well as by publishing too little.

Another question now arose. How was the information embodied in these notes to be written out? It was desirable to use, as far as possible, the very words that Mr. Thompson had employed. The book should be his composition, not ours. Yet to give to the world the hurried jottings of the moment, and the unrevised memoranda of successive years, could not be thought of. We knew how carefully the "Birds of Ireland" had been written, and with what critical and fastidious nicety the proof-sheets had been corrected by him, and that he had even availed himself of the kindly criticism of two of his attached friends. We felt sure that had he lived the present volume would have been an object of equal solicitude; and we thought that we might endeavour to do what would have been done by him. It was agreed, therefore, that detached memoranda might be united, that the facts observed by

different persons or at different times, should when practicable be brought together, and their union rendered less obvious by some changes of expression, which might impart a greater uniformity of style. Whatever doubts we might originally have held about adopting this course were dissipated by a memorandum in Mr. Thompson's own handwriting, which we found attached to some of his calculations as to the space the materials collected for the "Natural History of Ireland" would occupy. It was dated July, 1849, and was in the following words:—"Should I die before these volumes are prepared for the press, it is my express desire that none of my notes be printed without having undergone *rigid correction*. I have always written so hastily and carelessly."

These preliminaries being arranged, Mr. Garrett took under his charge all notes relating to Mammalia, Reptiles, and Fishes. To me was allotted the duty of examining all Mr. Thompson's journals and letters, of extracting from the diary of his continental tours and his visit to the Ægean what seemed of general interest, with a view to determine whether such materials should be embodied in a memoir of his life, or whether such memoir should be restricted to the brief and simple form in which it now appears. On me also devolved the incidental correspondence which arose in the progress of the work. At a later period we applied to Professor Dickie, of Queen's College, Belfast, for his valuable assistance in the remaining (Invertebrate) portion of the volume. It was cheerfully promised, and, after due examination of the materials placed in his hands, Dr. Dickie undertook to do in that department what Mr. Garrett was doing for the other; his only stipulation was that we should render all possible aid in those local names and references with which he, as a stranger, could not be expected to be familiar.

Throughout Mr. Thompson's notes, extracts from Dr. Ball's letters and references to him were of frequent occurrence. Mr. Garrett and I were desirous, after some progress had been made in the work, of submitting to that gentleman what had been done, so that we might feel assured that his meaning had in all cases been correctly rendered, and also that our mode of dealing with the detached memoranda met his approval. This was done, and the remainder of the manuscript afterwards sent to him for revision.*

* As Dr. Ball's name was of frequent occurrence in Mr. Thompson's MSS.,

To Mr. Hyndman, of Belfast, Mr. Thompson's associate in dredging excursions and his chosen companion in working out the Mollusca, Articulata, and Radiata, the manuscript was also submitted, and received many emendations and improvements which he alone could have supplied.

From the scrupulous care with which every portion of the manuscript was thus edited and revised, I can say without hesitation that all was done that lay in our power, to bring forward fully and fairly the materials which Mr. Thompson had for years been accumulating. And yet with all of us there was a deep conviction that the result so attained must needs be imperfect. We could deal only with the materials which we found; we could give only what Thompson had bequeathed. Had his life been spared he would doubtless have brought collateral knowledge to illustrate what to us was only a simple statement. He would have expanded what to us were merely the hurried memoranda of the moment, relative to some ascertained fact. He might in some instances have condensed and brought under comprehensive generalization more than one series of recorded phenomena. We feel, therefore, that we have claims on the consideration and indulgence of those readers who are pursuing in a truthful and earnest spirit the study of any department of natural science.

The kindness and forbearance usually accorded to a posthumous work will not be lessened by the fact, that one of those to whom the publication had been intrusted did not live to complete his allotted task. Mr. Jas. R. Garrett, my beloved and lamented co-trustee, died of fever in little more than three years after his friend Mr. Thompson. The painful duty then devolved on me of receiving both his manuscripts and the originals, together with those memoranda which he had written for his guidance in the work he had so nearly completed. To Dr. Dickie I turned in this new emergency, and the little that remained to be done was accomplished by him, with such co-operation as it was in my power to afford.

Enough has been said to indicate the nature and extent of the

as "my friend Ball," "Mr. Ball," "R. Ball, Esq.," and "Dr. Ball," it was thought better to adopt the latter designation throughout, although several of the notes were written many years before that well-merited honour had been conferred. The same plan was adopted with regard to the names of two other friends, Professor E. Forbes and Professor Allman. Notes contributed by Dr. Ball, while these sheets were passing through the press, are indicated by the signature "R. Ball."—Ed.

assistance rendered to the present volume by those friends who have acted either as editors or revisers. If the result meet with approval, to them be the honour; if otherwise, I am prepared to share the blame, for nothing whatever has been arranged without my concurrence, or written that has not passed under my revision. But in truth the book has to me associations more grave than any connected merely with literary praise or censure. It speaks to me of four lamented friends, Thompson, Forbes,* Johnston,† and Garrett;‡ they laboured in very different spheres, yet were all actuated by the same object,

> "to know
> The works of God, thereby to glorify
> The great Workmaster."

In little more than three years they passed away. They were endeared to me by personal intimacy or unreserved correspondence. Their labours are connected in different ways with the present volume, and in it their names are of frequent occurrence. What wonder then that a voice of solemn admonition comes to me from its pages, and breathes into my ear the words of the Psalmist, "The days of man are but as grass, for he flourisheth as a flower of the field; for as soon as the wind goeth over it, it is gone, and the place thereof shall know it no more!"

ROBERT PATTERSON.

BELFAST, 20*th March*, 1856.

* Professor Edward Forbes died at Edinburgh, 18th Nov., 1854. A sketch of his life and labours, from the pen of his friend and colleague, Professor Balfour, is given in the Annals of Natural History for January, 1855. It concludes most appropriately by quoting the statements made regarding him by four men of eminence, viz., an anatomist, a botanist, a geologist, and a zoologist, who well knew his merits.

† Dr. George Johnston died at Berwick-on-Tweed, 30th July, 1855, a town to which his labours have given a scientific celebrity. An enumeration of his principal writings appeared in the Athenæum and in the Literary Gazette on the ensuing Saturday (Aug. 4), and a Biographical Sketch in the Edinburgh Medical Journal of September, 1855.

‡ Mr. James R. Garrett died of fever on the 2nd of April, 1855, in the thirty-eighth year of his age. In the Dublin Natural History Review for July, 1855, there appeared a notice of the event, in which justice is done to his attainments as a naturalist, his "unassuming manners, kindly disposition, and simple yet refined tastes."

MEMOIR

OF THE LATE

WILLIAM THOMPSON, ESQ.,

PRESIDENT OF THE

NATURAL HISTORY AND PHILOSOPHICAL SOCIETY OF BELFAST.

A WISH has been expressed by some of the personal friends of the late William Thompson, that this volume should contain a biographical notice of his life and labours: in deference to the desire so expressed, the present memoir has been prepared.

It is brief, for his was a quiet and uneventful life; no "stirring incidents by flood or field" have to be recorded; nor difficulties long encountered and successfully overcome. It is brief for another reason: his letters do not in general contain those outpourings of thought or sentiment, those revelations of the inner man, which to reflective minds are even more interesting than the open and noon-day occurrences of the outward life. To his most intimate friends, his correspondence, though frequent, was of the briefest possible kind. Such letters do not furnish the biographer with materials likely to be of general interest; and remarks on persons or occurrences, made on the impulse of the moment, and transmitted in the full confidence of private friendship, should not, we think, be torn from their shrines, and exposed to public comment.

Our author, born 2nd of November, 1805, was the eldest son of a Belfast merchant, then extensively engaged in the linen trade; and, being intended by his parents for the same business, he received such an education as was at the time considered suitable for commercial life. In 1821 he was apprenticed to a highly respectable firm in the linen business, the staple trade of the North of Ireland. The senior partner of that firm, himself a keen sportsman, has survived the subject of the present memoir, and is not unfrequently referred to in the volumes on "The Birds of Ireland," as an authority on their habits.

A gentleman who was then in the same counting-house, and is now a merchant resident in Belfast, has kindly communicated some particulars respecting Mr. Thompson's habits and tastes at this period of his life. According to him, Thompson never showed any great inclination for business, but while engaged in it his habits were strictly methodical. His leisure hours were chiefly spent in rural walks, in which this gentleman, though ten years his senior, was frequently his companion. He

adds that he was fond of reading poetry, particularly the works of our great Dramatist.

Information still more detailed and more ample respecting the same period, has fortunately been obtained from one who had been Thompson's chosen playmate in childhood, his comrade at school, his companion in the same office when at business, and his friend in maturer years. This gentleman, Mr. William Sinclaire, had emigrated to America with his family, a few years prior to Mr. Thompson's death. When this little memoir was contemplated, application was made to him for reminiscences of the character and habits of his departed friend during the early period of his life, and he was more especially requested to give such particulars as he could furnish, as to the period when a fondness for Natural History pursuits first became apparent. To this request he had the kindness to reply, in two letters so creditable to himself, and so highly characteristic of his friend Thompson, that they are given almost entire.

LETTER I.

West Hoboken, N. J.,
January 26, 1853.

"The death of my poor friend in his very prime gave me much sorrow, and it was so little anticipated, that I could hardly realize that William Thompson was dead. I shall do everything in my power to elucidate the life of my oldest friend, even from his boyish days.

"William Thompson and I were at school together for several years, during all which time he never evinced the remotest taste for those pursuits to which he devoted himself with such ardour at an after period, and he passed through the different branches of an education, such as it was in those days, with nothing more than average ability, nothing very brilliant, and in no respect ever dull. In regard also to the various sports and pastimes common to boys at that period, he never showed much aptitude, especially for such as required much muscular exertion. After leaving school, and in, I should think, his sixteenth year, he came into my father's office to learn the linen business, which I had been at some time previously. Here he came into immediate contact with my ornithological pursuits, the taste for which was, I may say, in me decidedly innate, as my earliest perceptions were drawn towards the flights of swallows as seen from the nursery windows, where I have spent many an hour in the summer evenings of my earliest days. At the time above alluded to I had commenced forming a collection of stuffed birds, and an old edition of 'Bewick's British Birds,' which was lent me by Dr. Drummond, was at the time in my office drawer, and at all leisure moments in constant use both for study and reference; it was therefore a very natural consequence that W. T., who was my sporting companion, should take some interest in the pursuit he saw me attending to with considerable ardour, and when the spoils of the day were brought home he began to be interested in identifying the species acquired; and the above volume of Bewick, with its beautiful and characteristic illustrations, gradually brought about in my friend a taste for birds, so that he then purchased a more recent edition of the work in two volumes, which thenceforth became our only work of reference. At this period, and for two or three years, he spent the summer in Holywood with the family, coming up to town every morning for business during the day, and returning in the evening for dinner. During

the autumn he was in the habit of shooting along the shore in the early mornings prior to coming up to town, and the various species of 'Grallatores' which at that season visit Belfast Lough were constantly acquired and identified from Bewick upon coming to the office; and I well recollect the interest taken in a very rare species killed one morning, the description of which was given to me, and the bird to have been brought the next day for preservation, when judge of the vexation of both of us at the miserable fate of the much-prized species, it having been plucked and cooked ere my friend's return in the evening! During this time my collection was going on, and W. T. began to have a few species preserved, which he had himself procured; I had previously given him lessons in the manual operations necessary for stuffing birds, but he never liked the trouble, especially the soiling his fingers, and I well recollect his first visit to a bird preserver in Belfast, to have stuffed a very fine heron which he shot; the bird being unwieldy from its great length of neck and legs, he did not like carrying it through the streets in the day-time (I may observe that in youth he was naturally shy, and did not like to attract personal notice), so we deferred our visit till evening, when we started with the bird for Nicholl's, who then lived in North Street; it was carried by my friend, holding it by the legs, and in order to prevent the head coming in contact with the ground, it had to be held so high, that even under gas light it became a most conspicuous object, and in passing along the streets attracted universal attention, and even remark, to the very great annoyance of poor T., and I am sorry to add to my great delight, suggesting that probably the amazement of the spectators was caused by the length of legs of both parties, viz., T. and the heron. That excursion was a standing joke in the office for many a day, and always taken by T. with the most imperturbable good nature."

LETTER II.

West Hoboken, N. J.,
February 9, 1853.

"Our various sporting and ornithological pursuits then went on for several years, up to the summer of 1826, when my friend made a tour upon the Continent; he was at that time so conversant with the birds of his own country that he made notes in regard to various species met with abroad, some of which are adverted to in his work on the 'Birds of Ireland.' I think I was at this time a member of our Natural History Society, which I well recollect urging him to join, without at that time success; he had not yet become enthusiastic enough in the pursuit, and was, as I remarked before, rather shy and diffident. From this time, for several years, he hunted regularly a good deal with me, seldom missing a day when the hounds were out; these were favourable opportunities for making ornithological observations, and our notes were frequently compared in the evenings as to the birds seen by either or both during the day; he had great power of sight, and nothing escaped his keen observation. As an instance of his power of vision, I may mention that he could distinguish the pole erected on the top of Devis mountain, above Belfast, when leaving Lurgan on horseback to return home. About this time he displayed a considerable inclination for planting trees, and had a most correct taste for landscape gardening. He was well acquainted with the forms and peculiar habits of growth of all our forest trees, both indigen-

ous and exotic. He planted many various species at the family place in the country, and, had he ever gone there to reside permanently, would have beautified it much by his taste in this department of rural pursuits. Up to the years 1830 and 31, his taste for Natural History was more that of an amateur than a scientific naturalist, and he had every intention of pursuing the business to which he had been brought up; but in these years circumstances of a domestic nature occurred which had the effect of altogether changing his intentions with regard to business, and in fact to make him give it up entirely. This was the pivot upon which his future life turned, and I am satisfied, had matters then gone on as he wished, we should never have heard of him as a naturalist. But such not being the case, and his mind being of such a cast that frivolous pursuits had no charm, he began in real earnest to devote himself to the investigation of the Natural History of his native country; and you will observe, that with few exceptions all his observations date from 1832.* From this period up to the time of my leaving Ireland, he and I were in the constant interchange of thought in regard to ornithological observations, and he was always most particular in noting down at the time anything new that I might have observed in our favourite branch of Natural History; and the frequent allusions to the 'Falls' in his works, always recall something to my mind probably long forgotten. Many a pleasant ramble he and I have had together; one of our favourite excursions was to Colin Glen, entering at the foot and ascending to the top of the glen; every foot of the way would be subjected to his indefatigable research; the heaps of fallen leaves would be our 'diggings,' and were as carefully searched for land shells, as ever were the golden lands of Australia or California for that treasure, the love of which 'is the root of all evil.' The trees and rocks afforded lichens, the sandstone its fossils, while overhead among the foliage not a bird could open its mouth, without note of observation on our parts. Sometimes the top of Colin, and at others that of Devis, would be our aim; if in summer, the golden sunsets as seen from the latter, when the orb of day would slowly descend beyond the waters of Lough Neagh, were to my friend inexpressibly charming; he saw nature with a painter's eye and a poet's soul, and the apt quotations from our best poets, which were always so ready, would be given with great expression. I cannot recall those days without much sorrow for his loss; I still looked forward to a period when I might again revisit my native land, and the most pleasing anticipation was that of again rambling to some of our former haunts, and living over again the days of our youth or early manhood: that vision has faded, never to reappear."

The usual length of an apprenticeship to business—five years—was completed by the subject of the present memoir early in 1826.

That year was a memorable one in the life of Mr. Thompson, then in his twenty-first year. In the spring he set out on his first visit to the Continent, accompanied by his friend and relative, the late George Langtry, junior, Esq., of Fort William, Belfast. Their route lay through Holland and Belgium, thence by the Rhine to Switzerland, Rome, and Naples; returning homewards by Florence, Geneva, and Paris. Travelling was in 1826 a slow and expensive procedure, compared with what it now is.

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* It was in the month of June this year, in company with Mr. Hyndman, that he made his first Natural History excursion to Strangford Lough, County Down, where he visited many of the islands.

Scenes which were at that time known but to a few of our countrymen, and those belonging to the wealthier classes, are now visited annually by thousands, and are more familiar to tourists than many parts of these kingdoms.

During Mr. Thompson's tour, which occupied four months, he was daily in the habit of noting down the leading incidents of his journey. These memoranda are occasionally copious, but in general they are very concise. They bear intrinsic evidence of being written on the spur of the moment, and do not embody in a narrative form the details of personal adventure and dialogue, nor discussions on habits and manners, remains of antiquity, nor works of art.

From some interlineations obviously added at a later date, it would appear probable that the author had intended at some future period transcribing into a more regular and extended form the rough notes of his original diary. If such was his intention, it was never fulfilled. To him the hurried jottings of the note-book would have been replete with meaning, rich in pleasant memories and bright associations. To others they are little more than a list of places and objects—sketches of scenery enjoyed—an enumeration of paintings visited—and occasionally a brief phrase expressive of admiration and delight.

We have read this journal with much interest, not for the sake of any information which it contains respecting the localities visited, but because of the manifestations it affords of the mental characteristics of the author. It furnishes examples of the habits of observation and the modes of thought by which he was afterwards distinguished. To those who knew him well, it likewise evinces his quiet humour, his appreciation of art, and the spring of poetic feeling which throughout life was ever welling up, amidst all his devotion to science.

But while the journal presents these attractions to the members of the family circle and a few attached and intimate friends, it did not seem to be such as would warrant publication. As a guide-book it is out of date, and the facts which it contains have been told by a hundred other writers. We felt convinced also that no one would have shrunk more sensitively than Mr. Thompson himself, from the idea of giving to the public the crude and hasty notes jotted down by him more than a quarter of a century ago. The first and the concluding paragraphs may, however, be given, as embodying the dates both of his departure from Belfast and his return.

"I commence this journal with the idea, that in after years I will read it over, and think upon it, as on a lovely dream never to be realized.

"On Sunday morning at nine o'clock, 21st May, 1826, left Belfast in the Chieftain S. P. for Liverpool. Sailing down the Lough, the shore on every side looked as beautiful as a fine summer day could make it, and when opposite Donaghadee the waters assumed the most glassy smoothness I ever witnessed. Our vessel stopped here to land a party of pleasure; all the boats of the town, that were scattered around us, in an instant ceased their motion, and nothing was heard in the intervals of our music ceasing, but 'the light drip of the suspended oar.' The waters lay calm and motionless as the sky above them, so that we could neither distinguish where the one terminated, nor where the other commenced, which made the vessels at a distance appear as if suspended in air."

The journal concludes thus:—

"20th September.—At three we set sail from Liverpool in the Chieftain, and after a delightful passage occupying seventeen hours, landed upon 'mine own, my native land,' about eight o'clock, on Thursday, 21st

September, having been absent (since 21st May) within a few minutes of four months."

Some time after his return he commenced business on his own account, with the intention of ultimately occupying the bleach-green at Wolf-hill, where his father had carried on a trade extensive for those days. The linen trade at that time was conducted in a different manner, and on a very different scale, from what it now is. Mr. Thompson for a time went on successfully, in proportion to the amount of capital employed. A change, however, took place, some losses occurred, and by these and other circumstances he was induced to abandon the idea of continuing in business. From this period science became not only the pleasure but the occupation of his life.

In 1826 he had been prevailed on by his friend the late Dr. Jas. L. Drummond, founder of the Natural History Society of Belfast, to become a member of that body. In the ensuing year, 1827, he was appointed a member of the Council. In that year, on the 13th of August, he read his first paper, choosing for his subject "The Birds of the Copeland Isles," situated at the entrance of Belfast Bay. He was chosen one of the Vice-presidents in June, 1833; was elected President in 1843, on the retirement of Dr. Drummond, and was annually re-elected during the remainder of his life, a period of nearly nine years.

In 1827, when Mr. Thompson visited the Copeland Isles, he made a few notes of some of the objects observed. This was a commencement of a series of memoranda botanical and zoological, remarkable both for their extent and their minuteness. Every locality visited furnished a supply of fresh materials, all of which were carefully preserved. When the time came for putting them in order and arranging them as scientific communications, they were carefully winnowed, and every grain of value which they contained was transferred to its fitting place, with all those details which authenticated the accuracy of the record. Twenty-four of those journals are now in possession of the editors. Some of them occupy but two or three pages; others extend to many sheets. They refer principally, as might be expected, to Irish localities, visited in the course of successive tours, or made the place of sojourn during a few weeks or months in the summer or autumn. But they are not limited to these; they refer to some of the loveliest and most romantic English scenery, and also to portions of that of Scotland, especially of Ayrshire, Inverness-shire, and the islands of Islay and Skye. The last of these journals was written at Newcastle, County Down, in the autumn of 1851, and consequently but a few months before his death.

During this long period of years he gave great attention to specific distinctions, and was gifted with an eye quick in detecting their existence. It was a natural result, that he would soon be able to detect species which science had not yet named or described, and others well known but unrecorded as Irish. Having satisfied himself of the accuracy of the facts, the next step was to impart a knowledge of them to his brother naturalists, by communications to different Societies and to scientific periodicals. He first came forward in this way in 1833, by submitting to the Zoological Society of London some notes on the *Sterna arctica*, and other birds observed in Ireland. In 1834 he contributed a paper to the same Society, which appeared in their Proceedings; and another to the Linnæan, the substance of which was published in the London and Edinburgh Philosophical Journal of that year. His first appearance as a contributor to the Magazine of Natural History, whose

pages he enriched with many valuable articles, took place in 1836, and did not cease until a few months prior to his death.

The London men of science were not slow in appreciating the value of these papers on the Natural History of the Sister Isle, nor the unassuming worth of the young Irishman who was their author. The consequence was, that acquaintance thus commenced ripened in many instances into permanent friendships. What wonder, then, that an annual visit to London should be one of Mr. Thompson's greatest pleasures! There he mingled with that variety of intellectual fellowship which the great metropolis alone can afford. There he not unfrequently had difficulties removed and doubts cleared up, such as every Naturalist who critically examines species has at times experienced. To London he brought for comparison, specimens which seemed to him ill-defined, and which could not be satisfactorily determined, except by reference to books and specimens which were not accessible in a provincial town. The meetings of the London societies, the conversaziones where the devotees of science, of literature, and of art, mingle so happily together, had peculiar attractions to a refined and cultivated mind such as Thompson possessed, and which was not narrowed by a too exclusive attention to one pursuit. He took pleasure in every ennobling effort of the intellect, in the fair creations of the artist—the bright imaginings of the poet, in every discovery within the wide domain of physical science, and in the applications of its laws to lessen the labour or minister to the happiness of man.

From about the year 1833 he went steadily on recording the occurrence of species previously unknown as Irish, and gradually accumulating the materials for a Fauna of Ireland. As his labours became better known, correspondents in every province of Ireland sprang up, and information of the most varied character poured in upon him. This was sifted with exemplary care. Questions were asked, and if not answered with sufficient perspicuity, new interrogatories followed, until his own mind was perfectly satisfied as to the accuracy of the statement. It occasionally happened, that the communication related not to something in relation to the habits of a well-known species, but to the capture of a species which was either rare or known only as the denizen of other lands. In such cases he sometimes did not rest content, until he had the opportunity of examining the specimen, and determining the species by actual inspection. That being done, then all details were given, especially the date, the locality, and the name of the correspondent to whom he was indebted for the information. Detached observations, each separately of little account, assumed a new character when combined, and bearing the stamp of his scrutiny and approval. Parties residing in widely scattered localities felt gratified at their observations being permanently embodied in Mr. Thompson's papers, and were thereby stimulated to co-operate by every means in their power. Thus a body of observers sprang up, who made choice of Mr. Thompson as the channel for what they wished to announce, in connexion with the Natural History of Ireland; and never was such assistance more scrupulously acknowledged than by him. Perhaps no one of his mental characteristics was more uniformly manifested than his anxious desire to record any assistance he had received, and to express his gratitude for facts communicated or specimens sent for his inspection.

In the busy community amid which Mr. Thompson lived, he was the only one who was devoted to Natural Science, and whose time was so entirely at his own disposal as to be given up to its cultivation. Among

the professional men, the merchants and manufacturers of Belfast, with whom he mingled, he stood in this respect alone. To him, therefore, all intelligence was brought of natural objects possessing either rarity or interest in the neighbourhood. To men of all ranks, thus calling to impart information, he gave a courteous reception; to none more so than to the young. Many will remember the searching cross-examination to which, on such occasions, they were subjected.

The labours in which Mr. Thompson was engaged for more than twenty years of his life were not those which were obvious and external. To many a toiling mortal in his native town, he must have appeared to be one of those favoured individuals who have nothing to do. Yet few were more industrious, or more persevering in the execution of his self-appointed task. Every hour in the day had its allotted duty. For four hours after breakfast he was engaged in scientific research, preparation for the press, or in correspondence. Exercise for two or three hours followed. The interval between dinner and tea was given to the lighter literature of the day, and when the claims of local societies and social intercourse left him free, the study was again the scene of two or three hours' additional work ere bed-time. Such was the ordinary routine of his life, subject only to occasional interruptions of a local or personal nature.

Not only did each day present in some respects a general resemblance to other days, but the very years of his life, for a long period, had a great uniformity of character. With spring came a visit to London—then a sojourn with the family at the sea-side—in the autumn a little tour with some friend—an attendance on the meeting of the British Association for Science, or an excursion to shooting quarters in Scotland. The month of November found him settled once more at home, and resuming the daily routine of occupation already mentioned. Throughout life he took pleasure in field sports; and for many years went out regularly to hunt during the season.

It would not serve any useful purpose to endeavour to trace in detail the incidents by which one year was distinguished from another; we pass on, therefore, to the year 1840, in which, at the Glasgow meeting of the British Association for the Advancement of Science, Mr. Thompson's "Report on the Fauna of Ireland—Division Vertebrata," was brought forward. This was not merely an enumeration of the vertebrate animals of Ireland; the comparative abundance or scarcity of particular species, and their distribution in that island, so far as it had then been recorded; but it was also an exponent of the number of species inhabiting this the most western land of Europe, compared with those known as British, and in some instances with those of continental countries. The knowledge acquired during many years of careful observation and patient research were here embodied in a manner the most simple and perspicuous. It was justly characterized by Prince Charles Lucien Bonaparte as "a valuable and lucid essay, which faithfully exhibits the subject, and seems worthy of imitation."*

The ensuing year brought with it to Mr. Thompson a change of scene, and an abandonment for a time of all the established routine of occupation. Early in 1841 his friend Captain Graves, of H.M. surveying ship,

* "Report on the State of Zoology in Europe, as regards the Vertebrata, read at the third meeting of the Italian Congress of Science, Florence, 1841." Published by the Ray Society. London, 1845.

the Beacon, then laid up at Malta, paid a visit to Belfast. Acting in conformity with that devotion to science by which he had been ever distinguished, Captain Graves took measures to obtain from the Admiralty, for Mr. Edward Forbes—the late (alas! that we should have to speak of him as the *late*) eminent Professor of Natural History in the University of Edinburgh—the honorary appointment of Naturalist to his vessel, then about to proceed to the Ægean. A survey of the Island of Candia was at that time in contemplation. On his arrival in Belfast, Captain Graves kindly invited Mr. Thompson to join the party, and succeeded in inducing him to do so, as a most welcome guest.

In consequence of these arrangements, Mr. Thompson and Mr. Forbes left London together on the 2nd of April, 1841, and proceeded by Paris and Marseilles to Malta, where the Beacon then was. On the 21st of April they embarked, reached Navarino on the 28th, and anchored at Syra on 6th of May. Leaving the vessel there, Captain Graves and Mr. Thompson, on the 11th of May, embarked in the French steamer Sesostris, for Smyrna and Constantinople. On their return, a few days were spent by the three friends together in the Beacon, and in short excursions connected with the surveying work that was in progress. Mr. Thompson then started on his return homewards, accompanied by Mr. Wilkinson, son of the British Consul at Syra. They reached Athens on the 12th of June, Trieste on the 18th, Venice on the 30th. Thence Mr. Thompson's route was by Milan, Constance, Strasburg, Manheim, Cologne, and Antwerp, reaching London on the 19th of July, after an absence of about three and a half months.

The first fruit of this voyage was a paper published in the Annals of Natural History, and afterwards reprinted in the Appendix to the Birds of Ireland. It was entitled, "Notice of Migratory Birds which alighted on, or were seen from, H.M.S. Beacon, Captain Graves, on the passage from Malta to the Morea, at the end of April, 1841." It enumerates twenty-three species, seen under those circumstances, and is valuable because of the critical knowledge and accuracy of the observer, and its bearing on a question of popular interest, which cannot be better stated than in the words Mr. Thompson has himself employed. "Persons even of education," says he, "still exist who are incredulous respecting the fact that many species which in summer frequent the British Islands, winter south of the Mediterranean, and cross that sea annually on their northern migration in the spring; but surely the fact of twenty-three of them having been seen crossing the Mediterranean during several successive days in spring, and all flying northward, should be a conclusive proof; in addition to which it may be stated, that migratory species only were observed."

During this tour a journal had been regularly kept by Mr. Thompson. It is much fuller and more carefully written than the journal of 1826. Fifteen years had passed since his former visit to the continent, and had brought with them the ordinary amount of change. On a part of the route traversed in either going or returning, steam had been at work, and old modes of conveyance had been superseded. Some of the scenery had been modified in its character; "formal" vineyards had replaced on the banks of the Rhine much of its natural planting; and wood had been cleared away even in the proximity of the ruined castles. "Thus," he remarks, "are they divested for the sake of gain of their richest charm. Were Byron now to write of them he could not say with truth, 'Where ruin greenly dwells,' though when I was last here, the expression was

strictly applicable." Changes had in some cases taken place in the condition or in the habits and customs of a community. Thus, in Venice, as the journal informs us, "The gondolas are greatly changed for the worse since 1826, the fine steel front being now only seen on old ones; the modern are simply bound with polished steel for a protection, and instead of the canopy overhead, a common awning is used, which in some is plain canvas, in others blue and white striped, and a few more tasteful, all as in British boats. In connexion with the fast disappearing gondolas, I could not but think of the changes in Greece and Turkey. Pictorially, it is a pity that it is becoming a more matter-of-fact world every day, though it is well that the human race is becoming daily more and more one great family. In the evening I saw a few gondolas, each rowed by two livery servants (*à l'Anglais*). I could not hear any songs of gondoliers this time, though in 1826 they were occasionally to be heard."

The changes, however, which the journal indicates as having occurred in the external world, are few compared to those which had taken place in the mind of its author. Fifteen years of the most active period of man's existence had passed by, and had cast their mellowing influence both on his feelings and on his intellect. He had lived during that time among the intelligent inhabitants of his native town, and among the literary and scientific circles of Metropolitan Societies. His reading had not been restricted to Natural Science, but had embraced biography, history, travels, poetry, and the fine arts. The journal in every page indicates his more mature and cultivated intellect; and passages occasionally occur which breathe a comprehensive charity for his fellow-men, and a sympathy with their social advancement. There is, too, a discrimination in praise or in censure, which time and experience alone can give; and a nice perception of beauty in form, outline, colouring, and aërial tint, which mark the artistic eye. To personal friends, therefore, it contains much that is interesting. Yet it cannot be denied that many scenes or incidents which are graphically narrated, are told as well or better by other travellers, such as the ordeal of a Turkish bath—the slave-market at Smyrna—a turtle chase in the Ægean, and the absurd annoyances connected with the Lazaretto at Trieste. The journal too is obviously a personal and private record, not written with a view to publication. But while the insertion of it as a whole would not seem justifiable or judicious, a few extracts illustrative of the remarks which have just been made, may not appear out of place, especially if they be regarded as revelations made by Thompson himself of his own mind, perceptions, and feelings.

VALENCE to AVIGNON, April 9th, 1841.—"Never did I see the Almond in flower look so beautiful as to-day, when several large trees in full bloom were in their graceful beauty backed by dark-hued rocks." "Finally, to contrast the scenery of the Rhine and the Rhone, in vine-covered hills they are alike—the rivers are much on a par—the Rhine rather the grander—the Rhone more varied by the hills coming forward and again receding or folding in the most romantic manner back and forward. No verdure from grass or pasture is to be seen on the Rhone banks, the more Southern character of the vegetation being from ferns springing from a sterile soil. The Rhine has its numerous castles, but against these are the snow-clad mountains seen from the Rhone."

May 5th.—"The setting of the sun, as we lay off Syra, was very grand, so many hues as the land displayed I never before witnessed. The island on which he sank was empurpled; another displayed the ordinary distant blue; those in the west were tinged with lilac. Immediately in the fore-

ground some little islets looked richly green, and one strongly displayed its grey sterile rocky barrenness. After sunset for some time the hues of earth and sky were still more varied. Syra, which was purple a short time before, assumed a dark rich oil-green, and strongly *cut*, whilst the water at its base was no less strongly marked."

Syra, May 9th.—"Dined with Mr. Wilkinson, the British Consul. From the balcony of his drawing-room is the finest and most beautiful view I have ever seen from a house situated in a town. It is placed at a great height above the sea, and commands a view over several of the islands, some of them at a considerable distance. The sea is beautifully clear beneath, and several species of fish are seen feeding and gambolling about. The hues of the sea-weed, too, are extremely pleasing to the eye, the rich green of the *Ulva* so much exceeding that of any plants seen here on land. Just below the balcony fishermen were engaged last night, with torches of pine, spearing the fish that were exposed to view. Here the water is shallow, and the fishermen waded; whilst further out the sepia or cuttle-fish hunters were engaged, and with a brilliant light placed on a gridiron-like article, placed at the bow of the boat, looked most picturesque."

May 12th.—"At half-past five o'clock we left Smyrna in the Sesostris French steam-packet for Constantinople. The "jable" of green waves up to the quay was precisely as I have seen them represented in some of Claude's paintings, and I think in some of Canaletti's fine Venetian views."

Delos, June 2nd.—"Never was I so struck with the appearance of utter desolation as at Delos. At Rome, Athens, &c., the ruins connect the past with the present and tell the tale of many centuries, but here all is past—there is no present—not a human being claims the island as his home, though still before us are the columns of one of the seven wonders of the world, and well might the temple of Apollo (judging from its ruins) so be called."

Venice, July 2nd.—"Went to church [Santa Maria de Fraria], containing Canova's tomb, the grandest monument I have ever beheld: design and execution are alike most admirable. Opposite to it in the church is the tomb of Titian, with his simple surname inscribed on one of the ordinary floor flags of the building. How strange this seems! The galleries of Venice teem with his sublime paintings, many of them in colours rich and glowing, as they had just passed from the hands of their great artificer. We are enraptured with them, and pacing over the floor of a neighbouring church, start back with affright on lifting our foot from a common flag, to find that it rested upon and covered the name of Titian, who sleeps beneath it. In Venice, however, should Titian rest. In many respects is it of high importance that the mortal remains of the workman should thus as it were go hand in hand with his noblest work. Thus are the mortality and immortality of earth a striking lesson!"

"The first mournful reflections over on visiting such a tomb, do we not feel the bodily and intellectual pulse beat quicker, and urge us on to the best work of which we feel ourselves capable, before we are hidden beneath the flag-stone."

Aldstatten, July 11th.—"The mountain rises steeply from the town, and before proceeding very far, a most grand and extensive prospect was presented. In the immediate foreground on the sloping mountain-side all was of the loveliest Swiss character. Most picturesque cottages with their pretty little gardens and numerous bees'-caps placed against the

houses. Against one cottage I reckoned fifty of these, of ordinary size. Each abode with its appliances seemed a little paradise; everything, too, being in that order which betokened in their owners, what above all things most delights me, a heart at ease. Such a sight strikes upon the inmost chord of a passing stranger's heart, see it in what part of this world he may."

APPENZEL, July 12th.—"The eastern side of the mountain-chain which separates the canton of St. Gallen from Appenzel is a grain, fruit, and vegetable country. On the western side, where it slopes into a great table land, very many square miles in extent, it is meadow or pasture, unbroken by a single patch of grain, vegetables, or fruit. It seemed to me a practical illustration of what should be done the whole world over, the energies of every country being applied to whatever it could do best, and its surplus production exchanged with its neighbours."

The Zoological notes scattered through the journal are few in number. The botanical refer chiefly to the appearance of plants or trees in connexion with their altitudinal range or geographical distribution.

The enjoyment which Mr. Thompson experienced in his tour to the Ægean, had, like all other earthly pleasures, a certain portion of alloy. In his case, this proceeded principally from his sensitiveness to sea-sickness when in the vessel, and from the heat and vermin in some localities on shore. But he always spoke in glowing terms of the beauty of the classic and historic scenes he had visited, and the kindness not only of his friend, Captain Graves, but of all the officers of the Beacon.

From 1841 to 1843, he was a frequent contributor to the Annals of Natural History, and he was steadily preparing his Report on the Invertebrate Fauna of Ireland. This was presented at the Cork meeting of the British Association, in August, 1843; and, to use the words of the Very Rev. the Dean of Ely, was "remarkable for the minuteness and fulness of the information which it conveys." * At the same meeting, Professor E. Forbes, who had returned to these countries, presented his valuable "Report on the Mollusca and Radiata of the Ægean Sea."

The attendance of members and associates at the Cork meeting was unusually small; but those who compare the number and importance of the papers read in the Natural History section with those at other meetings, will find no inferiority there, and will naturally attribute a portion of the success of Section D. to the personal influence and character of Mr. Thompson, who acted as its President, and whose courtesy on the occasion was noticed by all. His own communications he compressed into the briefest possible space, so as to give time and opportunity for the reading of those contributed by other members.

At intervals during the succeeding five years, he was engaged in preparing for the press his intended work on the Natural History of Ireland, and in writing, for the Annals of Natural History, the well-known series of papers on the Irish Fauna. But his labour was liable to many interruptions. Some of these were caused by visitors; some by the arrival of new specimens, or the sending away of duplicates to other Naturalists; but chiefly by the extensive correspondence in which he was engaged. His letters were in general very concise, and went at once right to the subject-matter, in the briefest terms. They often consisted of merely a message or a question, written on a scrap of paper, signed with his initials,

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* *Vid.* address of the Very Rev. Geo. Peacock, D. D., as President of the British Association at the York meeting, 1844.

and then enclosed in an envelope. Dr. Ball, who for years had some of those communications almost every week, received one complaining that a question in the previous letter had not been answered. On searching for the "letter," which had been overlooked, Dr. Ball at last found it in his pocket-book, between the folds of a bank-note, into which it had accidentally dropped, and where, from its diminutive size, it had lain concealed!

This habit of writing upon scraps of paper, to the great embarrassment of editors and printers, is one to which several well-known authors have been addicted. We may refer as examples to the "paper-sparing Pope," whose translation of the Iliad, preserved in the British Museum, is written on the backs and other blank portions of letters; and to Sharon Turner, whose third volume of the "Sacred History of the World" is written on fragments of letters and notes, and on covers of periodicals.

The first volume of the "Natural History of Ireland" appeared in 1849; the second in 1850; the third in 1851. The reviews of it were, as might be expected, of a very favourable character; and letters relating to it, from many of Mr. Thompson's friends and correspondents, afforded him much pleasure. He valued very highly the good opinion of those he really esteemed.

The volumes contained a large amount of popular matter relative to the instincts, habits, and economy of our native birds, to which they were exclusively devoted; and among these were occasionally interspersed graphic descriptions of localities or of picturesque groups, such as Horn Head, County Donegal, vol. iii. p. 223; Grotto of Egeria, near Rome, vol. i. p. 367; and Grouse Shooting Scenes in the Highlands, vol. ii. pp. 54 and 55. As might have been expected, they were largely quoted from in the periodical literature of the day. Perhaps no one passage was more frequently republished than the one (vol. i. p. 11) in which the author dwells on the effects produced on the birds of a district by the industrial operations of man.

He had himself expressly stated that the volumes on Birds were "put forward merely as supplementary to the several excellent works already published on British Ornithology." Viewed merely in that light, they were welcomed as a very desirable addition to the stores left by preceding writers. When considered apart from other works, and simply as an exponent of what was known to Mr. Thompson respecting the Birds of Ireland, the philosophic mind found in its pages fresh food for speculation, especially concerning those great laws which regulate the distribution of animal life. The pains-taking care of its author was visible on every page; and, if some reader should now and then have wished that dates, localities, and names were of less frequent occurrence, by others these details were regarded as very desirable. To the future explorer of the Natural History of Ireland, such evidence will be of the highest value. It will satisfy him that Thompson has furnished a true record of the Irish Birds, as known to him and his correspondents. From the basis thus established, he may proceed to rear his structure with perfect confidence that he builds on a good foundation, and that, if his own observations be correct, and embrace a sufficiently wide range, he may contrast the then existing Birds of Ireland with the species which now belong to it.

It was during the time Mr. Thompson was engaged preparing this work for the press, that he became interested in the welfare of "The Belfast-Man"—Francis Davis—author of "Poems and Songs," published in Belfast, in 1847. They were composed, as the preface informs us,

"amid the monotonous din of the work-shop," the vocation in which Mr. Davis was then engaged being that of a muslin weaver, "an employment not very remarkable for its remunerative qualities." He now fills the responsible situation of Librarian and Secretary to the Working Classes' Association at Belfast; and, on being applied to by one of the Editors of the present volume, most kindly forwarded the following letter respecting his intercourse with Mr. Thompson:—

TO ROBERT PATTERSON, ESQ.

BELFAST,
November 22nd, 1854.

SIR,

Touching our distinguished townsman, the late William Thompson, Esq., and your desire to know something of the manner of that gentleman's acquaintance with me, I shall endeavour to state its origin and progression as briefly as possible. Some time after the publication of my first volume of verses, or towards the latter end of the year 1847, I was one day employed at my accustomed labour, when a fellow-workman, coming in, told me that a person outside wished to speak with me. On going to the door of the workshop, I was accosted by a gentleman, who asked me if my name were Davis, and whether I was the person who, under that name, had lately published a volume of poetry. On being answered in the affirmative, he said that he had for some time been making inquiries after me. He said he had felt delighted to think that a Belfast-man, in so humble a position, had won for himself such favourable opinions as those he had been lately reading in the *Athenæum* and in the *Critic*. He had read my book himself, he said, and was highly gratified by the tone of independence which characterized it. He asked me whether I considered politics the more legitimate sphere of a poet? I said that was a subject I had never thought upon, but that my opinion was, if but one individual could be taught, through verses, to look more kindly upon those who might think proper to differ with him in religion or politics, whole volumes of such had not been written in vain. He seemed to be much pleased with the reply, and said it was the duty of every man to do what good he could; and if, when doing his best, he might happen to err, it was only in judgment—in such cases, a mere matter of opinion. He then—and not till then—told me that his name was Thompson, gave me his address, mentioned the hours he was likely to be at home, and said he would be very happy at seeing me call upon him as often as I could make it convenient. Before leaving, he spoke of the Museum, the Botanic Gardens, and Linen-hall Library, asking me if I were in the habit of visiting them. On my saying that I had never been to any of them, he asked me whether I would not wish to have the privilege of doing so when I thought proper. I said that nothing could be more gratifying to me: he then took his departure, promising to let me hear from him the next day. I did hear from him the next day; I received a circular entitling me to attend, on that night, at a "Reading" delivered to the Natural H. S., of which Mr. Thompson at the time was President. On the same night, I received from his hands the authority of the different Committees to visit the Museum, the Linen-hall Library, and the Botanic Garden, at any time I thought proper. From that time till the time of his death, Mr. Thompson was to me, not merely a *friend* and *patron*, but a *father*—a *kind* and *indulgent* father. For two or three years before I had seen Mr. Thompson, my health had been gradually on the decline, and, in a few months after our first interview, I became so reduced in bodily strength that I was compelled to give up my ordinary occupation, to which Mr. Thompson never afterwards would allow me to speak of returning. A situation more suited to my constitution, he reasoned, would "turn up to me some time." Alas! his words, though prophetic, he did not live to see fulfilled.

It would be impossible in the space I have at present assigned myself to give more than a faint idea of Mr. Thompson's friendship to me, and exertions in my behalf, during a period of some five years. I can never forget his kindly greeting and good-bye when we met and when we parted—his judicious counsels, and friendly criticisms on any writings I subjected to him, after having turned to literature as a profession—and the total absence of anything like a manifested feeling of superiority, either in intellect or position.

It is almost needless to say, that a person circumstanced as I was during the greater portion of the time—if not the whole of the period—I had the honour of his acquaintance, had to be obliged to him for more than advice. At one time out of employment; at another, unable for it; and, again, depending on the sometimes uncertain earnings of a contributor to the columns of a London periodical, I may have known difficulties; but, if so, it was ever my own fault. His purse was as open to me as his smile; and a rebuke—such a rebuke as only such a man could give—when I at any time questioned the propriety of accepting, on the grounds of such a shadowy prospect of return.

From upwards of forty letters, by Mr. Thompson, in my possession, I might produce more than as many illustrations of the preceding—of the amiability and benevolence of him who, while he never forgot what was necessary in the gentleman and the scholar, always remembered that he was a MAN.

This much and *more*, on my part, is due to his memory; you will, therefore, please to use it as you may think proper.

I have the honour to be, Sir,

Your obedient Servant,

FRANCIS DAVIS.

From the year 1847, Mr. Thompson's health was somewhat uncertain, and at times required a good deal of care; it was, in fact, gradually giving way under the attacks of an insidious disease of the heart, to which he ultimately fell a victim; and circumstances of a private nature occurred, which brought with them much mental anxiety. Yet, with these sources of disquietude preying upon him, he continued his attendance at the committee meetings of all those local Societies, in whose progress he felt an especial degree of interest; and the Society for Promoting Knowledge, the School of Design, the Natural History and Philosophical Society, and the Botanic Garden, continued to have the advantage of his services.

In 1851, at the Ipswich meeting of the British Association for Science, a deputation, of which Mr. Thompson was one, attended, and it was unanimously agreed that the meeting for 1852 should be held at Belfast.

From this time forward, Mr. Thompson was in frequent communication with influential members of the Council of the Association; and in January, 1852, he was deputed by the Committee, in Belfast, to proceed to London, attend a meeting of the Council there, on the 31st, and conclude the needful preliminary arrangements.

This being done, he spent a few days with his London friends, and was preparing for his return home, when, on Sunday, the 15th of February, whilst walking in one of the public streets, he was seized with dizziness in the head. He was able, however, to walk to the residence of his friend, Dr. Lankester, who was speedily in attendance. The doctor observed on one side of the face evident indications of slight paralysis, and accompanied him home. He saw him again in the evening, and applied remedies for the removal of a difficulty of swallowing. Next morning, Dr. Lankester, not finding him better, wished for additional medical advice, and Mr. Lane, an eminent surgeon, was accordingly called in. In the evening,

Mr. Busk, of Greenwich, whose name ranks high, both as a naturalist and a surgeon, arrived, and the three medical gentlemen saw their patient so late as ten o'clock on Monday night. At eight o'clock next morning Dr. Lankester was summoned to his bed-side, and found on his arrival that he had breathed his last! His death took place on the day he had intended leaving London on his route homewards.

He died remote from home; but it was consolatory to know that, during his brief illness, he had received every possible care and attention from the inmates of the house where he lodged, and was watched over by his kind and valued friends, Mr. Yarrell, Professor Edward Forbes, Dr. Lankester, and Mr. Busk.

A letter from Dr. Lankester to a mutual friend reached Belfast on Wednesday evening, and announced the unexpected and melancholy event. The sensation which the intelligence excited it is impossible to describe; the sentiments expressed in the following paragraph, taken from the *Belfast Mercury*, of February 21st, were universally felt:—

"Death of William Thompson, Esq., President of the Natural History and Philosophical Society of Belfast, &c.—A meeting of the above-named Society was held at the Museum, on the evening of Wednesday last, and before the members had separated, a letter had been received by one of them, announcing that their respected and distinguished President was no more. Next day, this melancholy event became generally known throughout town, and all seemed to feel that Belfast had lost one of the most eminent of her sons. In private life, our lamented fellow-townsman occupied a position no less honourable than his standing in scientific circles. His kindness of heart, lofty principles, and generous sympathies, made him universally beloved and respected."

Another of the Belfast Papers, established about a month afterwards, took occasion to introduce into its first number a review of the three volumes of the Natural History of Ireland, then published, and gave expression to the following observations respecting the author:—

"It is to us a source of sad reflection that, at the very commencement of our career, we should have to perform the painful task of adverting to the loss of a fellow-townsman, whose untiring labours in the investigation of the Natural History of our country had earned for him a wide-spread fame, and whose spotless life, dedicated to the advancement of every ennobling pursuit, had won the respect and love of all who enjoyed the high privilege of intercourse with him. The study of Natural History has been justly recommended, as 'an exercise for the mind, a suggester of thought, and the fountain of a high philosophy, promoting the great cause of humanity and love.' Its effect on the subject of our brief memoir accords with the recommendation; for seldom has any man enjoyed, within his own circle, more universal respect whilst living, and never was the loss of a fellow-citizen or friend more keenly felt. Many who owed their first acquaintance with him to the similarity of their tastes and pursuits, regarded him with a warmth of affection which even the ties of kindred seldom impart; and we do not believe that one human being entertained towards him a hostile feeling. The same gentleness of disposition which led him to regard his fellow-man with kindness, he also evinced towards the whole animal creation, as his writings amply testify."—*Belfast Mercantile Journal and Statistical Register*, No. 1, March 30th, 1852.

On the 21st of February, 1852, the Saturday succeeding Mr. Thompson's death, a notice of the event appeared in the *Athenæum* and in the *Literary Gazette*. Each journal contains some information which the other does not; both, therefore, are given, as conjointly they convey a correct idea of the opinion entertained of Mr. Thompson by men of

science in the metropolis. On one point there is a seeming discrepancy in the two journals, one mentioning the Report of the Fauna of Ireland as having been brought forward at Glasgow, the other at Cork. Both are correct; the Report on the *Vertebrata* having been presented at the former meeting; that on the *Invertebrata* at the latter.

"We have to record the death of Mr. William Thompson of Belfast, which took place very suddenly in London, on Tuesday morning last. Mr. Thompson had been visiting our metropolis chiefly with a view to making arrangements for the approaching meeting of the British Association in Belfast,—of which he had been appointed by the council a Vice-President. Mr. Thompson was well known on various branches of Natural History, and one of his works, 'The Birds of Ireland,' we reviewed so lately as September last. [Athen. No. 1236.] He devoted himself principally to zoology—though all branches of Natural History and Comparative Anatomy received a share of his attention. Science is indebted to him for the ardour with which he investigated the zoology of his native country, and the large number of his papers in the annuals and magazines of Natural History attest his great diligence in this respect. He was an early friend of the British Association for the Advancement of Science; and, at the meeting held at Glasgow, delivered in a Report on the Fauna of Ireland. He constantly attended its meetings; and, subsequently to his Report in 1840, he contributed many papers on the Natural History of Ireland. It was owing to his efforts that the Natural History section was so remarkably successful when the Association met at Cork. His investigations on the Zoology of Ireland were subservient to a great work which he had planned on the Natural History of that island, and which, had his life been spared, there is no reason to doubt he would have completed."—*Athenæum*.

"WILLIAM THOMPSON, ESQ.

"It is our painful duty to record the death of this eminent and amiable Irish naturalist. He had come to London to attend a meeting of the council of the British Association, to assist in making the necessary arrangements for the forthcoming gathering in the town of Belfast, of which he was so distinguished an ornament. On this day week we conversed with him when in good, though not robust, health and spirits, little anticipating that before three days we should be writing his biography. He died suddenly, after a short and slight indisposition, in his lodging in Jermyn Street. Mr. Thompson was born in the year 1805, and from his earliest youth was warmly attached to scientific and literary studies. For the last fifteen years, or longer, his name has been constantly before the world of science in connexion with arduous researches on the Natural History of Ireland. The very numerous memoirs published by him, chiefly in scientific periodicals, and latterly more especially in the 'Annals of Natural History,' of which publication he was a warm admirer and supporter, extend in their subjects over all departments of zoology, and several are devoted to botanical investigations. He was constantly on the watch for new facts bearing on the Natural History of his native island, which, assuredly, could boast of no more truly patriotic son than himself. At the meeting of the British Association at Cork, he was appointed President of Section D, and conducted the proceedings of his department with a judgment and suavity that made them eminently successful. On that occasion he read an elaborate Report on the 'Fauna of Ireland,' since published in *extenso* in the Association 'Transactions;' and it was his intention to have communicated a continuation to the present day of that Report at the Belfast meeting. He did not confine his inquiries to Irish subjects, but added considerably to our knowledge of the Natural History of several parts of England and Scotland; and when Professor E. Forbes proceeded to the Ægean at the invitation of Captain Graves, Mr. Thompson, himself an intimate friend of the distinguished officer just named, accompanied him, and devoted the short time he was in the Archipelago to interesting zoological observations, since published, chiefly

on the migration of birds. His love of ornithology was indeed intense, and the results of his labours in that department are narrated with full and charming details in the volumes that have been published of his great work on 'The Natural History of Ireland.' His name is associated with many discoveries, and numerous species of new creatures have been named after him. His reputation stood equally high on the continent and in America, and he had been elected an honorary member of several foreign societies. Entirely devoid of any envious feeling, loving to coöperate with others, and to assist in furthering their researches, truthful and energetic, he spared neither time, labour, nor pains, to help in every possible way all who were engaged in kindred pursuits. He numbered among his intimate friends and correspondents all (we may say almost without exception) the eminent naturalists of the day, and equally all those who might be little known but were of good promise. His love of the fine arts was only second to his love of science, and for many years he was one of the most active promoters of tasteful pursuits, and especially of painting, in Ireland."—*Literary Gazette.*

An obituary notice respecting him—one of their earliest and most constant contributors—appeared in the Annals and Magazine of Natural History, for March, 1852, p. 246, which, after the previous quotations from other London periodicals, it seems unnecessary to quote.

(*From the Dublin University Magazine, April*, 1852.)

"It was only last month that we devoted a portion of our pages to a review of 'The Birds of Ireland,' by William Thompson; and we then indulged in pleasing anticipations of what we had yet to expect from the labours of the author. A sadder task now devolves upon us; the hopes we had then fondly cherished, are destined never to be realized;—the accomplished naturalist, the high-minded man, the warm-hearted friend, has ceased from his earthly labours; and it now only remains for us to bid memory take the place of hope. There were few more pleasing features in his character than the interest he always took in the success of the several literary and scientific institutions of his native town. Imbued with a deep and genuine patriotism, and fully recognising in such institutions the means of elevating the moral and physical condition of his fellow-countrymen, he spared neither time nor labour in the promotion of their welfare; and his purse was always freely open in their cause. Utterly free from envy, he was always ready to help onwards in the same paths of science the less experienced searcher after truth; and many a living naturalist owes whatever success has subsequently attended his career, to the encouragement thus cordially given. 'The love of truth and the love of his country were inseparably blended with his nature, and became the leading influences in his simple and unostentatious life.'"

When the British Association for Science assembled in Belfast, on the 1st of September, 1852, William Ogilby, Esq., President of the Natural History Section, at the opening of the business, paid a just tribute to the memory of his departed friend, and proposed a resolution, which was unanimously adopted, to the effect that the members of the section desired to put on record their deep regret at the loss both science and humanity had sustained by his sudden and premature death.

Mr. Thompson differed from the generality of naturalists, in the wide range of his research. He gave attention not only to the long series of vertebrate and invertebrate animals (excepting Insecta and Infusoria), but also to the vegetable kingdom in all its various forms. Some departments of Cryptogamic botany gave exercise to his powers of observation, as shown by his paper "On a minute *Alga*, which colours Ballydrain Lake," and more especially by the number of localities contributed by him to his friend Professor Harvey's splendid work, the "Phycologia

Britannica." The "Hortus siccus" formed by Mr. Thompson, and now in the Belfast Museum, is of itself an enduring evidence of his industry and research.

For many years prior to his death he was in the habit of giving every aid in his power to those who were preparing for publication works on certain departments of either Zoology or Botany. His specimens and his notes were ever freely given for such purposes. There are few authors of such works in these kingdoms who have not gratefully acknowledged their obligations to him; and some distinguished continental naturalists have expressed their thanks for favours of a similar kind.

In connexion with his labours it is a natural inquiry, what was the number of his various published papers? where and when did they appear? what were their subjects? what was the extent of each? It is fortunate that to all these queries a satisfactory reply can be given, for a list in his own hand-writing, found after his death among his MSS., gives the desired information. The list is published in the Appendix to the present volume, and extends to nearly 100 papers, exclusive of "The Natural History of Ireland," which, however, embodied much of the material dispersed throughout his previous writings.

Another inquiry naturally arises from a glance over the titles of these publications. Many of them contained notices of species new to the Irish Fauna; some of them species unrecorded as British, and a few of them animals previously undescribed, or, to use his own words, "new to science." The papers embody not only his own observations, but, as has been already stated, those of many individuals in different parts of Ireland with whom he was in correspondence. How many species, it may be asked, was he the means of recording as additions to the Irish Fauna? The total number is between 900 and 1000. It cannot be stated with perfect accuracy, for some species are what are termed "critical," and with regard to some, Mr. Thompson's own views underwent a change. But this does not materially affect the result, and he, therefore, stood in the proud position of having made known nearly a thousand species of animals living in Ireland or on its coasts, whose existence there was previously unrecorded. Our admiration of the assiduous labour by which this was accomplished is enhanced by the consideration that, during the latter portion of his life, it was carried on amid the weakness and suffering attendant on failing health. But the result remains, forming a lasting addition to our stores of knowledge, and a monument to him as a man of science, more imperishable than the "storied urn or animated bust" of the sculptor.

Let us now turn from the consideration of Mr. Thompson as a man of science, to those manifestations of his habits of mind, his peculiarities of taste, and his modes of action, which may serve to indicate to those who knew him not, what "manner of man" he was.

To a stranger introduced to him when he was attending one of the London Societies, or presiding at one of the meetings in the Museum at Belfast, he would have appeared courteous, but formal, polite, but reserved; willing to listen, and ready to impart information, if required. But a stranger would not suspect that under that cold exterior there lurked a quick perception of the ludicrous, and a truly Irish enjoyment of humour. And none but intimate friends could be aware how deeply the poetic element was interwoven in the tissues of his existence. Shakspeare ever continued his prime favourite; and a volume of extracts from his plays was his constant travelling companion; but Milton, Burns, Byron,

Shelley, Moore, Wordsworth, Montgomery, and Tennyson, were all in turn admired, and the peculiar beauties of each justly appreciated.

His delight in the Fine Arts has already been noticed, and also his enjoyment of the beautiful or the sublime in natural scenery. To travel with him was to see things in a new aspect, and to derive pleasure from what would, but for him, have been unnoticed. The distant trees became individualized under his glance, and their characteristic foliage made manifest. The flight and peculiar note of every bird were known, so that, if either the flap of a pinion was observed, or a remote call was heard, the species was at once named. The tintings of the hills were pointed out, and the beam of sunlight on the heath or the mountain dwelt on with the delight of an artist.

It perhaps belongs to the inherent infirmity of man's nature that the very faculties which, from their nicety, are the source of such refined and elevated pleasures, should also, under other circumstances, give rise to discomfort or annoyance. Such was Mr. Thompson's case. He felt annoyed by matters which other men would have passed by unheeded. Discords of colour pained his eye, as discordant sounds would have grated on his ear.

His methodical and business-like habits rendered him a valuable member of any public committee. The same regularity was apparent in all his actions, joined with a constant attention to neatness, and a desire to have nothing wasted or uselessly frittered away. He never obtruded his opinions; and no man could be more unwilling to give utterance to a remark that might give pain to another. But when one of those with whom he was really intimate sought his advice, it was given with the utmost candour. He had the rare moral courage to speak not only the truth, but the whole truth, as it appeared to his mind. The sincerity with which he expressed himself on such occasions gave great weight to the sound and excellent opinion which he pronounced. One instance of this may here be mentioned. A friend had been preparing a little Natural History work for publication. The volume was completed, and its author had taken some pains in writing an elaborate preface, explanatory of his views. This was sent to Mr. Thompson for revision, and was returned with some pencil-marks and a brief note:—"I never saw anything of your writing I liked so little." The consequence was that the unfortunate preface was put into the fire, and one shorter and better suited to the character of the work was substituted.

His thoughtful consideration was shown in many little touching ways towards those whom he numbered among his friends. The "trivial fond records" that might be furnished from such sources would show the genuine kindness of his nature, even better than things of greater moment. They spring from actions the most unstudied and spontaneous; they originate in the heart rather than in the head. Who would suppose that such a man, in order to give pleasure to the children of a friend, would carefully lay aside each little illustration that catalogues or specimen-pages might contain, and then, from time to time, as the envelope in which they were deposited became filled, send them to his friend's residence? Yet such was the simple fact.

Mr. Thompson died unmarried, in his forty-seventh year, and was interred in the family burial-ground at Belfast. The members of the Natural History and Philosophical Society, over which he so long presided, determined on erecting a memorial, the nature of which is best explained by some extracts from the circular which was then issued:—

"At a special meeting held in the Museum, on the 10th March, 1852, a series of resolutions was unanimously adopted, expressive of the feelings entertained by the members as to the great loss they had sustained by the death of their late president, Wm. Thompson, Esq. A committee was then appointed to consider the most suitable mode of doing honour to his memory. This committee, after careful consideration, reported that the most appropriate memorial of Mr. Thompson would be a separate room to be added to the Museum, and be called the 'THOMPSON ROOM,' in which should be placed the private collections which he had bequeathed to the Museum. This method of testifying the Society's estimation of Mr. Thompson would have the double advantage of perpetuating his name within the Museum, and of preserving for reference a large portion of those specimens to which he alludes in his writings on the Natural History of Ireland. This report of the committee was unanimously agreed to, and the council were authorized to have it carried into immediate effect."

The necessary funds were speedily subscribed, and the "Thompson Room" erected accordingly.

A striking likeness of Mr. Thompson appeared in 1849, in the series of scientific portraits, published at the expense of Mr. George Ransome, at that time Honorary Secretary to the Ipswich Museum. By the kind permission of that gentleman, the frontispiece of the present volume has been copied from the former portrait, by the same talented artist by whom the original had been taken.

Several of the leading naturalists of the day have at different times marked their estimation of Mr. Thompson's character and labours, by dedicating to him some undescribed species of animal or plant. The touching yet appropriate words employed by Professor Bell, when giving to a small marine animal, taken in Belfast Bay, the name of his departed friend, may form an appropriate conclusion to this little Memoir:—* "I have a melancholy gratification in dedicating this species, by name, to a gentleman who, for many years, was justly considered as the representative of the Zoology of Ireland, and whose acute discrimination and persevering enthusiasm in his favourite pursuit were only equalled by the liberal and unselfish feeling with which he placed his treasures in the hands of his fellow-labourers, whenever he believed the interests of science would be thereby furthered. The specimen from which the above description is taken was placed in my hands, by my lamented friend, only a very few days before his untimely death deprived the science of Ireland of one of its most distinguished ornaments, and society of as kind and true-hearted a man as ever lived."—p. 373.

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* The species is *Pagurus Thompsoni*, dredged at 50 fathoms, entrance of Belfast Bay, by Mr. Hyndman. Vide Bell's "History of British Stalk-eyed Crustacea."

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CLASS MAMMALIA.

SECTION I.—MAMMALIA TERRESTRIA.

ORDER I.—CHEIROPTERA.

Family Vespertilionidæ.

THE COMMON BAT OR PIPISTRELLE, *Vespertilio Pipistrellus*, Geoff.

THIS is the common bat of Ireland, and is abundant from North to South.

I have examined specimens from all quarters of the island, since the publication of the Rev. L. Jenyns' paper, in the 16th vol. of the Linnæan Transactions, on the subject of the common bat of Pennant.

The common Irish species had been previously considered the *Vespertilio Murinus* of Linnæus, and of recent continental authors. It is, however, the *V. Pipistrellus*, as described by Mr. Jenyns, and figured by Geoffroy in the Ann. Mus. d' Hist. Nat.; and is, consequently, identical with the common bat of England.

In the summer evenings, I have more than once stood still within a few yards of the bat, and looked with much interest on its pursuit of moths, for the capture of which it is so admirably fitted. But I have also been occasionally surprised at the length of time required to effect the seizure of a single insect, even when the bat was apparently using its best exertions for that purpose.

A female of this species, which Mr. G. C. Hyndman retained for some weeks in captivity, had, when taken (in the month of July), a young one clinging to the teat, which position it retained until its death, two days afterwards. Living flies or moths, when put into the cage, were seized by the parent bat with her mouth. She did not make use of the claws in catching or holding them. After seizing such food, the bat bent her head downwards, apparently with the view of preventing the escape of the prey, every portion of which was eaten, the wings not excepted. This captive drank plentifully of water, offered on the end of a feather, and, when catching at food, made a slight screaming noise. After being accustomed to be fed, she uttered a kind of chirp, when expecting anything. Scraps of raw beef or mutton were eaten readily, if quite fresh and juicy, but not otherwise.

In the North of Ireland this species is seen abroad throughout mild winters, as frequently noted in my journal, from which the following memoranda are extracted:—

On 9th December, 1832, between two and three o'clock, P. M., the day being fine, but rather dark and cloudy, one of these bats flew closely past me, and continued within view for a considerable time, during which it was pursued by a pair of wagtails (*Motacilla Yarrellii*), evidently to its great annoyance.

On the 3rd and 21st January, 1834, I also saw two others, in the neighbourhood of Belfast, at half-past four o'clock, P. M. The thermometer, at two o'clock on those days, respectively, was 52° and 51° of Fahrenheit.

6th December, 1850.—A bat of this species was observed flying through one of the streets in Belfast, at twelve o'clock, noon. The day was very fine and mild, with bright sunshine.

The Reddish Grey Bat, *Vespertilio Nattereri*, Kuhl.

An individual of this species is recorded by Mr. F. M'Coy as having been obtained near Dublin.—*Vide* Ann. Nat. Hist. vol. xv. p. 270.

This is one of the species which I thought would probably be added to our catalogue, from the circumstance of my having found a specimen among the ruins of Harlech Castle, Merionethshire, as noticed in the Proceedgs Zool. Soc. 1837. It had previously been obtained only in the East and South-East of England.

Daubenton's Bat, *Vespertilio Daubentonii*, Leisler,

Is only known as Irish from a specimen obtained by the Ordnance collectors, in the County of Londonderry. The species was determined by Mr. Jenyns.

Long-Eared Bat, *Plecotus auritus*, Geoff.,

Is common in suitable localities throughout the island. Specimens from North, East, and South have come under my examination.

Dr. R. Ball considers this species more common about Youghal than the pipistrelle; and Mr. T. F. Neligan was of the same opinion with respect to Kerry.

When the roofs of old houses are being repaired or taken down, in the North of Ireland, numbers of these bats are often discovered. The pipistrelle frequents similar places, but is probably less gregarious, as I have not known it to be found so plentifully under similar circumstances, although it is more frequently seen flying about. The roofs of houses have been referred to, by some writers, as being uniformly resorted to by the long-eared bat. I have, however, known several of this species to be taken from the crevices of an old stone wall, in the course of its removal, although many houses were in the vicinity.

In the month of January, 1833, I obtained, from an aperture in the roof of an uninhabited house, a long-eared bat, which did not exhibit any symptom of torpidity. When placed in a room lighted from the North, it flew to the top of the cage in which it was confined, and turning its back to the window, clung by its feet to one of the wires, with the head downwards and wings approaching each other, so as nearly to meet in front. Small fragments of raw meat, when offered to it, were invariably rejected with a scream, and, when left in the cage, were afterwards found untouched. This bat lived but a few days, and after death retained the same position in its cage as above described.

ORDER II.—BESTIÆ.

(*Feræ Insectivoræ.*)

THE HEDGEHOG, *Erinaceus Europæus*, Linn.,

Is found in suitable localities throughout Ireland.

With respect to the carnivorous propensities of the hedgehog, the following note was communicated, by Mr. R. Davis, jun., to *The Zoologist* for 1846 (p. 1293):—

"Some years ago I had three or four hedgehogs which I kept in a garden, of which they had the range; in the same garden I also had several rabbits. After they had been together for some days, I found that a rabbit was killed every night, the remains of the skin and the bones only being left. This I supposed to be done by my neighbours' cats, and prepared to wage war on them accordingly; but, to my surprise, on peeping into the garden one morning, I saw a hedgehog busy at work, with his nose buried in the fresh-cut throat of an expiring rabbit: and, from further observations, I had no doubt that the hedgehog had been guilty of all the murders. All the hedgehogs I have had seemed to become "possessed," and died in that state; each one, about three days before its death, was seized with apparent insanity, and continued to run backwards and forwards in a semicircular path it had beaten in the grass before its house from morning till night, and probably in the night too; they appeared to run as if for life, and evidently ran the life out of themselves, as, after about three days of it, they became exhausted and died, though previously they had appeared to be in excellent health."

A writer on the hedgehog, in *The Gardeners' Chronicle* of 18th July, 1846 (p. 480), states that, attracted by the cries of a leveret, he hastened to the spot, and found it struggling to release itself from the jaws of a hedgehog. Another correspondent to the same number of that periodical mentions the circumstance of one of these animals killing and eating five young chickens in the course of a night. Minute particulars are given in both instances.

An article, contributed by Dr. R. Ball, to *The Irish Penny Journal* (1840-41), contains a very full account of the habits and peculiarities of the hedgehog. One of these animals, kept in confinement by that gentleman, partook of a great variety of food, including "bread and milk, earth-worms, frogs, mice, sparrows, and various other animal matters." Another captive of the same species was supplied by Dr. Ball with whiskey mixed with sugar, in expectation that this regimen would have the effect of taming the animal:—

"The spirit soon showed its power, and, like other beasts that indulge in it, he was anything but himself; and his lack-lustre leaden eye was rendered still less pleasing by its inane, drunken expression. He staggered towards us in a ridiculous get-out-of-my-way sort of manner; however, he had not gone far before his potation produced all its effects—he tottered, then fell on his side; he was drunk in the full sense of the word; he could not even hold by the ground. We could then pull him about, open his mouth, twitch his whiskers, &c.; he was unresisting. There was a strange expression in his face of that self-confidence which we see in cowards when inspired by drinking. We put him away, and some twelve hours afterwards found him running about, and, as was predicted, quite tame, his spines lying so smoothly and regularly that he could be stroked down the back and handled freely. We turned him into the kitchen to kill the cockroaches, and know nothing further of him."

THE MOLE, *Talpa Europæa*, Linn.,

Is not indigenous to Ireland.

It is singular, when entering Scotland and Wales, at the nearest ports to Ireland, to see mole-hills in both those countries, almost as soon as we land. They are very numerous along the coast of Ayrshire, just opposite Antrim; and I have remarked them close by the roadside in Anglesea, near to Holyhead, which I mention on account of the *western* position.

12th Dec., 1838.—I examined the stomach of a mole, and found it entirely filled with earthworms. One or two, which were quite perfect, were of the short thick species, with the yellow band round the body.

At Aberarder, about 16 miles from the town of Inverness, I remarked burrows of the mole.

SHREW, or SHREW-MOUSE, *Sorex rusticus*, Jenyns.

This is the common shrew of Ireland, from North to South.

My descriptive notes on the species, made from numerous specimens, are not here required, as Mr. Jenyns has fully treated of it in the *Ann. Nat. Hist.* vol. i. p. 423, and vol. vii. p. 263.

All the shrews from different localities in Antrim and Down—from the Counties of Donegal, Fermanagh, and Armagh, and from Youghal, County Cork, which have come under my examination (with the exception of one specimen of the *Sorex tetragonurus*, to be hereafter noticed), are of this species, which is *the* shrew-mouse of Ireland. It is found from the low grounds to lofty mountain-tops, where these are clothed with verdure. Rutty calls it the Erdshrew or Grassmouse.

THE COMMON SHREW (of Great Britain), *Sorex tetragonurus*, Herm.

I have seen but one native specimen of this shrew, which was procured by the Ordnance collectors, near the Giant's Causeway.

In the *soricidæ*, as in some other Mammalia, we find a singular difference to prevail between those inhabiting Great Britain and Ireland, respectively, the common species of each island being rare in the other. As *Sorex tetragonurus* is the common one in Great Britain, so is *Sorex rusticus* in Ireland. I have found the *S. tetragonurus* dead about Leamington, Warwickshire, and have received it from different parts of Ayrshire. A specimen from the latter locality differed so much in colour from others in my possession, that I was disposed to believe it *S. castaneus*, Jenyns, Charl. Mag. *Nat. Hist.* 3, 581; but, indeed, this species can hardly be considered as satisfactorily established.—See Annals, vol. vii. p. 267.

From different parts of Ayrshire I have received specimens of *Sorex fodiens*, along with the *S. tetragonurus*. One of the former was caught by a cat, and brought into the house, where it came under my notice in a recent state.

Its stomach was filled with insects and their larvæ.

Richard Chute, Esq., of Blennerville, County Kerry, informed me that he caught, on the mountain above that village, a beautiful cream-coloured shrew-mouse, in the summer of 1840. It was larger than the common shrew, and he felt satisfied (without reference to colour) that it was of a different species. The specimen was not preserved.

ORDER III.—FERÆ.

THE BADGER, *Meles taxus*, Flem.,

Still maintains its ground throughout the island, perhaps in every county.

Templeton mentioned it as "nearly extinct"—a remark, no doubt, made correctly in reference to certain localities where he had previously known it to occur. But I have been surprised to find the tenacity with which it still clings to old haunts, even amidst encroaching cultivation, and where the surrounding districts have become more populous. So recently as the year 1844 I have been assured of the existence of this species within four miles of the town of Belfast, on each side of the bay; and in the year 1845 I saw four out of five specimens obtained at Florida, in the County of Down, one of which (an old female) weighed 25 lbs.

A sporting friend informs me, that when he was fox-hunting, some years ago, at Mountainstown (County Meath), two badgers were killed by the hounds, in a cover.

With reference to the food of this animal, I may mention that several of my correspondents have supplied me with proofs of its carnivorous propensities. One gentleman, who kept a young badger in confinement, reports that it was very fond of rats, mice, and birds, and that it devoured a pet blackbird which he highly prized. At Tollymore Park (County of Down), and Glenarm Park (County of Antrim), where badgers are numerous, they are sometimes taken in traps baited with rabbits; and I was informed by a gamekeeper, at the latter place, that they are destructive to young rabbits in the nest, and, in such cases, do not make use of the rabbits' entrance, but delve out a circular hole immediately above the nest. From the peculiar foot-print of the badgers, always to be seen about these holes, he knew that they were the depredators.

I have also heard of the skulls of sheep (supposed to have perished in the mountains) and the bones of birds being found abundantly in rocky places where badgers were located, and where foxes did not exist.

In 1848, Dr. Fleming mentioned to me that a badger which he kept was omnivorous; in addition to other luxuries, it sucked eggs and ate young birds. An experienced gamekeeper states, as the result of his observation, that this species lives chiefly on insects and the roots of plants, but that it is also partial to the refuse of foxes' earths.

A full and excellent account of the badger will be found in St. John's Wild Sports, &c., chap. xxxi.

Pennant remarks, that "Naturalists once distinguished the badger by the name of the swine-badger and the dog-badger, from the supposed resemblance of their heads to those animals, and so divided them into two species; but the most accurate observers have been able to discover only one kind—that whose head and nose resemble those of the dog."

Dr. R. Ball informs me, that in some parts of the South of Ireland the distinction of *dog* and *pig* badger is still retained.

THE OTTER, *Lutra vulgaris*, Erxleb,

Is still found in such localities throughout Ireland and along the coasts as it can inhabit, in spite of man.

These retreats are so numerous that it is unnecessary to enter into detail. Sea-caves and holes among the rocks are resorted to by the otter, along the northern coast, where there is no river in the neighbourhood;

and some of my southern correspondents have made the same observation, in reference to their districts. A gentleman residing in an inland situation considers that the species is there on the increase, in consequence of the measures now adopted to preserve the fish in rivers, and also owing to the withdrawal of rewards for otters' heads.

The size and weight of the individuals that have come under my own inspection, in a recent state, varied much. The largest one was a male, killed in October, 1847, near Drumbridge, on the river Lagan, a few miles from Belfast, and which is preserved in the Belfast Museum. Its dimensions were :—

	Feet.	Inches.
Length of head and body	2	7
— of the head	0	$5\frac{7}{8}$
— of the tail	1	$6\frac{1}{4}$
Girth at chest	1	$6\frac{7}{8}$
— at belly	1	8

Weight, 21 lbs. Several others have been killed near the same locality.

Mr. Ogilby was at one time of opinion that the Irish otter was specifically distinct from the English, and he named the former, provisionally, *Lutra Roensis*.—See Zool. Proc. for 1834 (page 111). He does not, however, now consider them distinct.

In 1845 I compared specimens from Annan with Irish otters sent to Sir William Jardine from Limerick, and found them to differ in the larger size of the skull of the latter and its proportions; but in no external characters was there any marked difference. Dr. R. Ball, who states that otters are very numerous in the South of Ireland, supplied me with the following note, in September, 1836 :—"I saw *Lutra Roensis* in the Zoological Museum, London. I have never seen an Irish otter that was not like it, nor did I ever see one like the specimen placed beside it, marked as the common otter, so that I am inclined to think we have not the variety (it does not seem more) common in England, and perhaps they have not ours." The same gentleman also remarks, that French otters differ more from English than the latter do from Irish ones. In April, 1850, Mr. Robert Langtry obtained a white otter at Islay, which he caused to be preserved, and sent for safe keeping to the Belfast Museum, where it yet remains. There is not a coloured spot on any part of this specimen. The stomach of a female, which was sent to a taxidermist in Belfast, contained several full-grown specimens of the three-spined stickle-back, and these only.

When at Florence Court, in 1840, I was informed that Lord Belmore had, for a long time, a tame otter, which was trained to catch fish. It did not invariably bring them to its master's feet, although it played its part in this respect very well.

Newspaper paragraphs announcing the destruction of otters in various parts of Ireland are of frequent occurrence.

Mr. St. John, in his Wild Sports, &c. (chap. xii.), gives an interesting account of the otter.

The Weasel, *Mustela vulgaris*, Linn.

I have never met with this animal in Ireland, nor do I consider that the species has yet been satisfactorily proved to be native, although it may be so. The stoat, which passes under the name of *weasel* in this country, is common throughout the island; and from the circumstance of Templeton having noted the weasel as "common," and the stoat as "rare," I am

led to believe that by *weasel* he meant *stoat*. Macgillivray tells us (Brit. Quad. p. 164) that the weasel "is generally distributed in Ireland," but no authority is given. Mr. J. V. Stewart notes both the weasel and stoat as occurring in County Donegal; and two skins of the true weasel were given to me, in 1842, which were *said* to have been obtained at Tor Head (County Antrim). Information from Tipperary and Kerry is in favour of its being found there, but no *proof* has been afforded; and correspondents in various localities, to whom the species is known as distinct from the stoat, are of opinion that the former is not indigenous to Ireland. It is, I understand, common in some of the counties of Scotland which lie nearest to Ireland. Both the weasel and stoat are, according to my friend Mr. Robert Langtry, found at Dunskey, Wigtonshire. The agent there told Mr. L. that, seeing a weasel (*Mustela vulgaris*) in pursuit of a rabbit, he sat down and watched the issue. The rabbit had superior speed, but the enemy followed by scent; and after dislodging it several times from burrows, eventually killed it.

THE STOAT (commonly called Weasel in Ireland),
Mustela Erminea, Linn.,

Is abundant throughout Ireland.

It varies considerably in size, but is generally about 10 inches long in head and body; tail (to tip of hair), 5¼ to 5¾ inches. Macgillivray (Brit. Quad. p. 156) enters particularly into the question of the difference of size in the stoat. He believes them all to be of one species.

Common as this animal is in Ireland, I have never seen or heard of a white one being taken in winter. Towards the end of our most severe winters in the north, I never saw any change of fur in these animals. Yet in the part of Scotland nearest to Ireland, where the difference of climate from that of the opposite coast must be most trivial, the stoat becomes white every winter; and even southwards, to Cornwall, in England, it is occasionally seen in this attire (Couch, in Bell's Brit. Quad. p. 151). On 24th March, 1838, I watched a stoat for a long time near Belfast. It had not a white spot upon it, though the winter had been remarkably severe.

A friend, who has occasionally resided at shooting quarters in Scotland, informed me, on 9th December, 1838, that a few days previously he saw two stoats, which had been killed at Glenappe (Ayrshire), and which were nearly all white. There had been scarcely any frost or snow during the winter.

The same gentleman also saw three of these animals taken in the early part of January, 1839, near Ballintrae, all of which were pure white, with the exception of the tips of their tails, and some portions of the face Although a veteran sportsman, he had never seen one even approaching to white in Ireland. On 27th January, 1846, a stoat, killed in Wigtonshire, was brought for my inspection. It was wholly white, except a patch of brown on each side of the face, and, of course, the lower half of the tail, which was black. The winter had been remarkably mild, with no frost or snow, although there was abundance of rain and storm.

The gamekeeper at Tollymore Park (County Down) informed me, in June, 1838, that he had on two occasions seen nests of this species. In one were about a dozen mice—a young rabbit and a young hare—also all the feathers and tail of a young woodcock. In the other he found six or seven mice, in addition to other things. They were packed regularly on the top of each other—"all laid the one way"—in beautiful ar-

rangement. In both instances the quarry were all dead. This is contrary to the views of a writer in the Magazine of Natural History.

In proof of the swimming powers of the stoat, I may mention an anecdote which I have learned from a trustworthy source:—A respectable farmer, when crossing in his boat over an arm of the sea, about one mile in breadth, which separates a portion of Islandmagee (a peninsula near Larne, County Antrim) from the mainland, observed a ripple proceeding from some animal in the water; and, on rowing up, found that it was a "weasel," which, he had no doubt, was swimming for Islandmagee, as he had seen it going in a direct line from the shore; and it had reached the distance of a quarter of a mile, when overtaken. The poor animal was cruelly killed, though its gallant swimming might have pleaded in favour of its life.

I have seen the stoat scampering over a very uneven wall of loose stones almost as rapidly as on level ground, and have admired its extremely graceful movements. That its agility renders it a dangerous enemy to the feathered tribes appears from the following note:—On 2nd September, 1851, the gamekeeper at Tollymore Park (County Down) showed me a Portugal laurel, bordering on a walk in the pleasure-ground, near the house, on the exposed side of which he was attracted, some years ago, by the loud cries of a song-thrush; and, on going near the scene, he saw a stoat descending the tree with a young bird. He instantly shot the depredator; and, on examining the nest, found that the stoat had killed a couple of the young, and partly demolished the nest. Two other young ones were, however, still safe, and he had no doubt that they were brought to full maturity by their parents. The site of the nest—about eight feet from the ground—was pointed out to me.

In July, 1850, a cat was observed, at Holywood House, in the County of Down, in the act of killing a full-grown stoat, which she brought to her kittens: they ate freely of it.

In 1845 a stoat was brought to Mr. Davis of Clonmel, which he gave to a friend, in whose house it became quite domesticated, and was greatly admired for the extreme lightness and elegance of its movements, and also for its ceaseless activity. At first it was kept in a cage, whence it escaped, and murdered a jay in the same room; after this it was not confined, but ranged at will through a large shop, a cellar, and two warerooms, and never evinced any wish to leave them. Here it became quite tame, and obviously preferred some members of the family to others. Its frolics in the shop were very amusing. Sometimes it would scamper along the counter; at others, run up a lady's back until it reached her bonnet; but its greatest delight seemed to be giving battle to two old stuffed magpies, twining round their necks, pulling out their feathers, and occasionally tumbling with one from the shelf on which they were kept. It was fed for several months on bread and milk varied with fleshmeat; its teeth had been purposely broken, and consequently it was not well able to kill mice.

POLECAT, *Mustela putorius*, Linn.

The polecat is not positively known as an Irish species to any naturalist, gamekeeper, or other person familiar with it, whom I have questioned on the subject.

It is said to inhabit the wild woods of Kerry; and I have received notes of the capture, in several other counties, of animals supposed to be of this species, but their identity has not been satisfactorily proved. Two

which were killed many years ago at Rosemount, Greyabbey (County Down), seem, from accurate description, to have been polecats.

As regards their distribution in Scotland, I may add that on 5th September, 1839, I saw several which were taken at Ballantrae; and in 1842 I was credibly informed that they were killed in the neighbourhood of Loch Cor.

The Common, or Beech, Marten, *Martes foina*, Bell.

The Pine Marten, *Martes abietum*, Ray.

The marten is found over the island, in suitable localities.

All the native specimens which have come under my own notice were yellow-breasted (*Martes abietum*), with the exception of one, which had the breast white (*M. foina*), and was killed in the County of Antrim. The difference of colour attributed to these animals appears to me of no value as a specific character, as in course of shedding their fur they become parti-coloured, the breast as well as the body presenting, at the same time, the colours of the beech and the pine marten. Mr. Eyton has published, in the Annals of Nat. Hist. (Dec., 1840—p. 290), some valuable remarks on the British martens, tending to prove that they are, in reality, of but one species. He states that the young animal has the yellow breast attributed to the pine marten; and the adult, the white breast of the common "species." I had also, long since, remarked that the yellow colour of the breast gave place to white. This view would satisfactorily explain why the yellow-breasted one (*M. abietum*) should appear to be the more common with us, as by far the greater proportion of animals that fall victims to man are those which have not arrived at full maturity.

As martens may be expected to become gradually more scarce with the improvement of the country, I shall notice the localities in which I have had satisfactory evidence of their occurrence — well-wooded demesnes chiefly—but it is probable that every county in Ireland possesses this animal.

In the following notes, it is generally uncertain which of the species or varieties is meant:—

County of Donegal	. . . .	J. V. Stewart, Esq., notes the yellow-breasted marten in his catalogue of the mammalia of this county.
—	Londonderry . .	Castledawson, and near Toome Bridge.
—	Antrim	Glenarm Park; Glenariff; Shane's Castle Park; vicinity of Larne; Tullamore Lodge; Castle Dobbs; and Malone House, within 4 miles of Belfast. A pair of martens were discovered, some years ago, in possession of a magpie's nest at the place last named.
—	Down	Hillsborough Park; Tollymore Park; Donard Lodge; and Belvoir Park, where a marten inflicted a severe bite on the hand of a boy who unexpectedly found it in a magpie's nest which he intended to rob.
—	Armagh	Lord Gosford's demesne; Tandragee and Churchhill.
—	Fermanagh . . .	Florence Court.
—	Longford	Carrickglass.
—	Galway	Connemara.
—	Tipperary	Woods about Clonmel.

County of Cork	Youghal (Dr. R. Ball); Barry's Court; woods near Bandon; Dunmanaway, &c. (Dr. Harvey in Cork Fauna.)
— Kerry	Common in this county, especially at the Lakes of Killarney.

"In the reign of Charles I., we find the Lord-deputy Strafford writing from Dublin to Laud, Archbishop of Canterbury, regarding some martens' skins:—'Before Christmas your Lordship shall have all the marten skins I can get, either for love or money; yet not to the number I intended.' . . . 'As the woods do decay, so do the hawks and martens of this kingdom.' . . . 'A good one of them is as much worth as a wether.'" *

The following anecdote was communicated to me by Mr. Edward Benn, in September, 1840:—A shoemaker at Cushendall got a young marten, which he partially tamed until it grew up. It then fled from him, but afterwards returned to the house in the evenings, and concealed itself, in order to catch the fowls which the cottagers were in the habit of housing at night. The culprit was caught by a man under his bed, but again made its escape, and, having become very troublesome, it was ultimately killed. The same gentleman informed me that in Glenariff the marten is supposed to eat nuts, cracking them on the tree, and leaving a part of the shell behind, and that he had known an instance of an imprisoned marten *gnawing* a hole through a shop-door in Hercules Street, Belfast, and thus obtaining its liberty. Mr. Wm. Berry, formerly gamekeeper at Donard Lodge, informed me, in August, 1851, that, within his recollection, a farmer in that neighbourhood had fourteen out of twenty-one lambs killed in one night, and that the destroyers had contented themselves with sucking the blood of their victims. On the following night the remaining seven were similarly treated, and a couple of martens were seen taking their departure from the scene of devastation. Their domicile was soon afterwards found in a magpie's nest, at Tollymore Park.

Dr. Scouler has brought together the following notes upon this and the allied species, in the Journal of the Geological Society of Dublin (1837):—

"*Martens.*—Under this head I shall include the different vermiform carnivoræ, which are natives of Ireland. It appears that Ireland still possesses all the species of this group, which are natives of England, and, consequently, that none of them has been extirpated; but they are now much less abundant than formerly, as will appear from the following quotations:—Even so late as the sixteenth century, martens' skins appear to have been an article of commerce in the province of Ulster. Peter Lombard, in his work entitled *De Regno Hiberniæ Insula Sanctorum*, after mentioning the wild boar and the wolf as common in Ulster, has the following observations:—'Præcipue *martes, quorum pelles plurimum estimantur*, et in universum in animalium magna pars est sita devetiarum hujus regionis.' † At a subsequent period, when the forest begun to be cut down, and agriculture was more attended to, the marten tribe was regarded as vermin, and various laws were enacted to encourage their destruction."

We require proof of our possessing all the English species. [*Vide* the foregoing observations on the polecat and weasel.]

In the Annals of Nat. Hist. vol. iv. p. 139, will be found a "notice of an uncommonly tame and sensible pine marten;" and the species is well described in the "Journal of a Naturalist," p. 129.

* Larne Literary and Agricultural Journal for February, 1839.

† Peter Lombard was born in Ireland in 1560; died at Rome, 1625.

THE WILD CAT, *Felis catus*, Linn.,

Cannot be given with certainty as a native animal.

I have received communications from correspondents mentioning the existence and occasional capture of *wild cats*, in various parts of Ireland, but I do not consider that we have yet sufficient data for including *Felis catus* in the Irish catalogue. As remarked by Bell, in his "History of British Quadrupeds," p. 179,—"In stating the localities and estimating the numbers of this species, it is necessary to guard against confounding with it the numerous instances of escaped domestic cats returning to a state of almost absolute wildness, breeding in the woods, and feeding on birds and small quadrupeds. These, though far less powerful than the true wild cat, are very destructive to game of every description, and, still retaining some traces of their old domesticity, they often revisit the farm-yard and carry off the poultry." In reference to the same subject, A. E. Knox, Esq., in his work entitled "Game Birds and Wild Fowl; their Friends and their Foes," adds:—"Gamekeepers need not be told that a more incorrigible poacher does not exist than a common cat which has been bred in the woods, or which, although originally an efficient mouser and a useful occupant of the barn, has gradually acquired the habits of a vagrant. The strength and size which a male cat will sometimes attain, under such circumstances, is extraordinary, although he never arrives at the proportions of his irreclaimable congener."

The following memoranda will put the reader in possession of the principal evidence which has come under my observation in favour of the existence of the true wild cat in Ireland:—

In Bell's "British Quadrupeds," above quoted, it is stated, in reference to the distribution of this species over the British Islands, that it "is now almost entirely restricted to Scotland, some of the woods in the North of England, the woody mountains of Wales, *and some parts of Ireland*." No further particulars as to localities are given.

Sir Wm. Jardine informed me, by letter dated 23rd October, 1837, that the wild cat is found in Erris (Co. Mayo), and that a specimen obtained there, within a few years previously, was then in the possession of Mr. St. Clair O'Malley, Lord Lucan's agent. This information was derived from Sir William's brother, when stationed with his regiment in the West of Ireland.

The author of "Wild Sports of the West" (letter 33) describes wild cats as killed in Erris, and properly distinguishes them from tame cats run wild.

A. E. Knox, Esq., in his work already quoted, says (p. 253),—"Although comparatively rare in Ireland, the species still exists among some of the mountains of Connaught." I have since learned from that gentleman that Maxwell's "Wild Sports of the West" was his authority.

J. V. Stewart, Esq., has included the wild cat in his catalogue of the mammalia of Donegal.

Mr. W. Andrews stated, in 1842, that in the glens of Caragh (Co. Kerry) it is known to the peasantry, who call it by an Irish name, signifying "*hunting cat*."—(See *Saunders' Newsletter*, Dec., 1842.) Mr. R. Chute, of Blennerville, in that county, was not, however, aware of the existence of this animal in 1846, although he had no doubt that it "was a native at one time, particularly about Caragh Lake."

In the "Larne Journal," Feb., 1839, p. 29, it is stated that "the wild cat is found in Tollymore Park, near Sleive Donard, and is also said to frequent the caves on the shore at Ballintoy;" but, on questioning Mr.

Creighton, Lord Roden's gamekeeper at the former locality, he informed me that he had never seen this species in Ireland.

The largest cat I ever saw (it weighed 10 lbs. 9 oz.) was shot in a wild state, at Shane's Castle Park (Co. Antrim), in Dec., 1847, and sent to Belfast for the purpose of being preserved. This specimen was *Felis catus* in everything but the *form* of the tail, which was not bushy at the end, and in the fur being finer in texture. It was as strong in every respect as that animal, but of a lighter grey colour than a *F. catus* from Invernesshire, with which it was compared. Throughout the entire body, legs, and tail, it had all the black markings of the true wild cat. The animal appeared to be a genuine hybrid between *Felis catus* and the domestic cat.

My relative Robert Langtry, Esq., on returning to Belfast from Aberarder, Invernesshire, in the middle of October, 1842, brought me two wild cats (*Felis catus*), an old and a young animal, which had been killed a few days previously. The story of their capture is as follows: Macgregor, one of his keepers, observed a great quantity of the feathers and other remains of many grouse about a "water-break" in his beat, and five of these birds, in excellent condition, just killed, and wanting the head and neck, but otherwise quite uninjured, so that they were taken to his master and served up at table. Suspecting that wild cats were the culprits, he set traps for them, and caught these two. He expected to capture two or three more, as the young generally keep with their parents. It was supposed that the wild cats would not have made any further use of the grouse off which they had taken the heads. These had probably been eaten.

The Fox, *Vulpes vulgaris*, Briss.

The fox, like the otter, is still found in suitable localities throughout the island, wherever it can remain in spite of man. In many parts of the country this species is abundant, but in no district of which I am aware have so many been taken as on the mountains in the south of the County of Down. The keeper at Tollymore Park, situated in this district, informed me, in August, 1851, that, since he came there, in 1827, he had killed upwards of 400 foxes in the neighbourhood. A little dog (the stuffed remains of which he still possesses) was at the death of 131 in the space of six or seven years. The poor dog was drowned when crossing the river in the park, during a great flood.

When visiting Dunfanaghy, and the neighbouring mountains of Donegal, on 27th June, 1852, a fox-earth, said to contain two old and five young ones, and situated above a small lake at the base of Rosheen, was pointed out to me. Two cubs, almost full-grown, were out sporting themselves, and I lay for a long time, at the distance of seventy or eighty yards, observing their gambols. They were playful as young kittens, and very graceful in their movements. At first they amused themselves about the mouth of the earth, but afterwards went quite away from it. A little further on I saw an old fox.

Professor Stevelly informed me, in September, 1851, that he frequently saw, at Col. Hodder's, Hoddersfield (Co. Cork), between the years 1815 and 1819, a pet fox, which was regularly fed with the fox-hounds, and went out pretty constantly with them in pursuit of wild foxes, taking as much pleasure in the sport as the hounds did. This fox frequently went away for upwards of a week at a time, but always returned of his own accord back to Hoddersfield.

ORDER IV.—GLIRES.

Genus Arvicola.

Of this genus we know nothing as Irish, and this is not to be regretted, though they do not intrude upon the dwellings of man, like the species of the genus *Mus*.

Four species of the *Arvicolæ* are found in Great Britain, viz.—

The Water Vole, *Arvicola amphibius*, Desm.,

Said to be found there pretty generally. I have remarked it to be very common about Leamington, in Warwickshire, on the banks of the Leam and the canals. The black variety (*A. ater*, Macgillivray) taken at Ballantrae, Ayrshire, was sent to me by my friend John Sinclaire, Esq., in August, 1842. It was found dead on the highway; and another was taken about the same time in a mole-trap—contents of stomach, vegetable matter only. From the last-named locality Mr. Sinclaire also sent me the ordinary animal, which is much more common. I make this observation in consequence of the remark of Mr. Macgillivray, that, in some of the more northern counties of Scotland, the black variety takes the place of the other.

J. V. Stewart, Esq., gives this species in his catalogue of the mammalia of the County of Donegal; but, in my opinion, erroneously.

The Field Vole, *Arvicola agrestis*, Brit. Authors,

I have found dead on roads in the north and south of England—about Newcastle-upon-Tyne, and in the Isle of Wight. It has, in some seasons, proved extremely destructive in England.

The Bank Vole, *Arvicola pratensis*, Baillon.—*A. riparia*, Yarrell.

[See observations on this species, in Charl. Mag. Nat. Hist. vol. iii. p. 585; and in Ann. Nat. Hist. vol. vii. pp. 274 and 276.]

Arvicola neglecta, Thomp.

I had the pleasure of adding this species to the list of British animals.

My notes on the species were communicated to the Rev. Leonard Jenyns, and published in the Annals Nat. Hist. vol. vii. p. 270 (1841).

So early as October, 1829, my relative Robert Langtry, Esq., called my attention to this species in his shooting quarters, around Megarnie Castle (Perthshire); but, as I had not then studied the mammalia, specimens of it were not preserved. The same gentleman, being some years afterwards requested to look out for and preserve any of these animals that might occur to him, found the species on his moor at Aberarder, in the north of Invernesshire; and, on his return thence, in 1838, brought me a specimen. A few others were seen, but were destroyed by the dogs; and in the following year he supplied me with a dozen of them, of various sizes, from that locality. They are, however, by no means numerous.

To my notes, published by Mr. Jenyns, I would only add, that the upper incisor teeth in adult males and females were one line and half long—lower incisors, two lines and a quarter.

In February, 1846, Mr. Langtry informed me that the first individuals of this species which he saw were found in the room where the dead game was kept, in Megarnie, and one or two were found dead about the door of the castle.

I am not aware of any British specimens of this animal having been noticed, excepting the above; and, from the circumstance of its being overlooked, the name of *Neglecta* was given to the species—a name which Prince Buonaparte does not seem to approve of; * but which appears to me not only unobjectionable, but good, as indicating a fact in connexion with the species.

* Reports on the Progress of Zoology and Botany.—Ray Soc., 1841-42.

The *Arvicola neglecta* is believed by M. de Selys-Longchamps to be the *Mus agrestis* of Linnæus, a species found in Sweden.

The Squirrel, *Sciurus vulgaris*, Linn.

Rutty remarks that the squirrel is "said to have been found in Lutterel's Town;" and there is a tradition that this animal was common in Ireland before the destruction of the native woods.

In O'Flaherty's West or H'Iar Connaught (1684), the squirrel is amongst the animals enumerated as then inhabiting that district.

The following extract from a letter, dated Edgeworthstown, 16th July, 1848, received by my friend Robert Patterson, Esq., from the venerable Maria Edgeworth (then, as she signed herself, in her 82nd year), is conclusive as to the recent existence of this species in some parts of Ireland:—

"I can assure you that squirrels are to be found in Ireland, to my certain knowledge, and in my neighbourhood; at Castle Forbes, the seat of the Earl of Granard; and at Carrickglass, the seat of Baron Lefroy. . . . . As we were driving through the woods, at Carrickglass, yesterday, a lady in the carriage looked up and saw something darting up the stem of a tree. It was a squirrel, new to her, as she was from Cork. In your next edition [Mr. Patterson's "Zoology for Schools" is the work here alluded to] I request you will enlarge your assertion respecting squirrels in Ireland, and not confine their existence to the County of Wicklow. They not only are to be found, but abound, in many places in Ireland, too numerous here to mention."

The gamekeeper at Donard Lodge, having formerly lived at Castle Forbes (County Longford), I inquired from him, in August, 1851, whether he had seen squirrels in the latter demesne; to which he replied, that when he was resident there, in 1836 and 1837, they were abundant, and that they were also numerous in the adjoining demesne of Carrickglass, but he had not known of their existence elsewhere. They were well known to have been introduced at Castle Forbes, but at what period he could not state. He added, that the late Lord Forbes, imagining that these animals did injury to the young shoots of the trees, offered to give him one shilling a-head for them, and that numbers were killed. On one occasion he shot twenty-five within the space of an hour. After being fired at, they became very wary.

A gentleman who resided for many years near Newtonmountkennedy (County Wicklow) informed me, in 1851, that they were plentiful in that locality.

Tunbridge Wells, October 4, 1847.—*Squirrels.*—My friend Mr. W. Ogilby and I saw several to-day in this neighbourhood, and all on *beech trees*, eating the mast; oaks, covered with acorns, adjoined the beech trees, but no squirrels were on them. Mr. O. remarked to me that he observed, when here last year, that they were never on oak trees, but that he saw them frequently extracting seed from the cones of the spruce fir.

Common Dormouse, *Myoxus avellanarius*, Desmar.

The dormouse is not indigenous to Ireland. Rutty observes that "a vulgar error has prevailed, mentioned in Johnston's *Historia Animalium*, that the dormouse was not found in Ireland." A sort of description follows, but by no means proving the animal to be the dormouse.

Harvest Mouse, *Mus minutus*, Pallas.—(*M. messorius*, Shaw.)

This species cannot be given with certainty as a native of Ireland. The only information received by me from any part of the country which

would lead to the supposition that the animal exists here is contained in the following extract from my journal:—

"May 12, 1838.—Mr. Adams, gamekeeper at Shane's Castle Park (Co. Antrim), mentioned to me what he had heard of a remarkably small kind of mouse and its nest, the description of which would apply to this species. The nest was built nearly as high from the ground as the narrator's knees, and was suspended between stalks of wheat, in a field of this grain: the old animals scarcely bent the stalks of wheat when running up them. The observer, a schoolmaster and farmer, resident within a mile of Shane's Castle, related the above to Mr. Adams, as an extraordinary fact which had come under his notice last autumn."

Long-tailed Field Mouse, *Mus sylvaticus*, Linn.

This species is commonly distributed throughout the island.

In gardens at a short distance from Belfast, I have known them to commit very extensive depredations on the early crops of peas and beans. Although annoying, it was at the same time amusing, to observe how completely they had carried off every bean of the first crop. These had been planted in double rows, and above every bean there was a cylindrical hole excavated, by which the mice had gained access to it. Traps made of a single brick were successfully used for their destruction.

In reference to the partiality shown by this species for beans, Pennant remarked, that "in some places they are called bean mice, from the havoc they make upon beans, when first sown."

I have known one instance of the capture of a long-tailed field mouse inside of an inhabited dwelling-house, near Belfast. The specimen was sent to me, and I compared it minutely with Bell's description (Brit. Quad.). It was much more dull in colour than any I had before seen, but was the true *Mus sylvaticus*.

In the Annals of Nat. Hist. vol. vii. p. 268, Mr. Jenyns published the following note:—

"*Mus sylvaticus?*—I have two or three times had submitted to my examination specimens of a mouse found on the tops of the Irish mountains, either belonging to this species or very closely allied to it; but those which I have seen have been in too bad condition (merely dried skins) to enable me to decide this point. One of these was taken in the County of Kerry, at an elevation of 2500 feet above the sea-level. The only respects in which they appear to differ from the *M. sylvaticus* are in being of a darker colour, smaller, and with some of the relative proportions rather less; but it must be left for those who have an opportunity of examining a large number in a recent state to say whether there are any real grounds for believing them to be distinct. On the whole, I am inclined to think that they are only a small variety of that species, somewhat modified in its character from the peculiar locality which they inhabit."

The specimens referred to in the above extract passed through my hands, and I had previously come to the same conclusion as Mr. Jenyns.

At Fort William, within a few miles of Belfast, two nests of this species of mouse were, within the space of a fortnight, found in one of the bee-hives, the mice having entered by the same aperture as the bees. Numbers of these intruders were caught in traps placed below the hives, and also close to the bees' entrance. In winter the mice often broke into the hive, and ate the honey-comb.

The Common Mouse, *Mus musculus*, Linn.,

Is too well known to require anything to be said as to its distribution.

Many years ago, I noted that numerous specimens, sent to me from stack-yards in the North of Ireland, were larger, lighter in colour, and more handsome than those found in houses. The Rev. L. Jenyns has since published the following remark in his "Observations in Natural History" (1846), p. 74:—

"The colours of the common mouse are naturally extremely bright, and can hardly be judged of from individuals found in houses, which contract more or less of a dingy hue from the dirt of buildings and the nature of the recesses they frequent. To see these colours in perfection, we should have recourse to mice found in stacks, which are often so remarkable for their bright yellow tinge, that I once thought they might prove to be of a distinct species. This is due to an annulus of yellow surrounding each hair on the upper parts, a little below the extreme tip, which in the domestic mouse is rarely noticeable."

The Black Rat, *Mus rattus*, Linn.

This rat, which once prevailed from North to South of the island, is now almost wholly extinct everywhere. It is not considered indigenous to Great Britain any more than the common brown rat, *Mus decumanus* (Bell's Brit. Quad.). Both are believed to have been introduced to Europe from the East.

I have received notes of the occurrence of black rats at Ballyheigne Castle (County Kerry); Youghal (County Cork); and Crowhill (County Armagh); but have no proof that they were of this species. Seven or eight of the latter were killed at Talaght, near Dublin, in February, 1834, one of which I saw in Mr. Warren's collection.

Colonel Portlock informed me, in 1840, that a specimen of the *Mus rattus* was sent to the Ordnance Museum, from Portglenone (Co. Antrim), by the late Archdeacon Alexander, who stated that they were tolerably abundant there.

In December, 1842, Mr. Edward Benn, of Glenravel, forwarded to me one of these animals killed in his neighbourhood; and Dr. Harvey, in the Fauna of Cork, p. 2, notes, regarding the species:—"In old buildings, in the northern parts of the city of Cork, near Garryclonne, &c., rare." There is no doubt of these being the true *Mus rattus*, and not black varieties of *M. decumanus*, which are sometimes mistaken for it, as Dr. Harvey, in a letter to me, observed, that "they were much smaller, more delicate in the limbs, and altogether strikingly different from the brown rat."

Mus Hibernicus, Thompson.

I made the following communication, on this species, to the Zoological Society of London, in 1837, in the proceedings for which year it was published:—

"*Mus Hibernicus*—(Irish Rat).—On questioning a person, some years ago, respecting a black rat which he had seen in the North of Ireland, my curiosity was excited by the statement that it had a white breast. In autumn last, a similar description was given me of one that had been caught, some time before, in Tollymore Park (County of Down). Mr. R. Ball, of Dublin, informs me that black rats, with the breast white, have been reported to him as once common about Youghal (County of Cork), though they are now very rare or perhaps extinct. But until April last, when a specimen was sent from Rathfriland (County of Down) to the Belfast Museum, I had not an opportunity either of seeing or examining the animal. This individual differs from the *M. rattus*, as described by authors, and also from specimens preserved in the British Museum,

and in the collection of this society, in the relative proportion of the tail to that of the head and body; in having shorter ears, and in their being better clothed with hair, as is the tail likewise; and in the fur of the body being of a softer texture. The difference in colour between the *M. rattus* and the present specimen is, that the latter exhibits a somewhat triangular spot of pure white extending about nine lines below the breast, and has the fore-feet of the same colour.

"The following is a comparison of this specimen with the *M. rattus*, as given by Mr. Jenyns. The same dimensions, with the very trivial difference of the ears being half a line less, appear in Mr. Bell's British Quadrupeds.

	M. Hibernicus. in.	lines.	M. Rattus. in.	lines.
Length of the head and body	7	6	7	4
——————head	1	10	1	10
——————ears	0	9	0	11½
——————tail	5	6	7	11
——— from the base of the ear to the snout	1	6		
——— from the tarsal joint to the end of the toes	1	6		

These differences incline me to consider this animal distinct from *M. rattus*, and, being unable to find any species described with which it accords, I propose to name it provisionally *M. Hibernicus*. Should future investigation prove it to be a variety only of *M. rattus*, it can be so considered under the present appellation."

The following information has been since obtained:—In March, 1838, Robert Langtry, Esq., informed me that, about fifteen or sixteen years previously, eighteen of these animals were killed, along with a great many common rats, during the "taking-in of a stack" of grain, at Fort William, near Belfast. There were three generations of them, viz.—two adults, several well grown, but apparently not mature, and a number of young ones.

They were nearly all killed by himself, and neither before nor since were any seen about the place. He described the animals so accurately, as to white breast, &c., that there is not a shadow of doubt relative to his correctness. The presence of three generations of this animal, in the same stack, with a great number of the *Mus decumanus*, speaks I think decisively against the latter species destroying them.

Mr. Edward Benn, who has frequently heard of the capture of black rats with white spots on their breasts, had it always described to him as being shorter in the tail than a second species of black rat, also described to him, and which was, perhaps, *Mus rattus*, a specimen of which, as already mentioned, he procured for me, in December, 1842. This gentleman had learned that black rats with white spots on the breast were, at one time, not uncommon about a flour-mill at Carrickfergus.

In August, 1843, I questioned the gamekeeper at Tollymore Park on the subject of this species, and he stated that he got a black rat there, about fourteen years before that date. It had a white breast; its tail, he was certain, was shorter than that of the common rat; and he felt sure that it could not have been a variety of the common species, for various reasons which he explained.

Were there not a difference in *form*, I should bring this animal under *Mus rattus*, as a variety; but, as those who have seen it all describe it to have a shorter tail than that species, I still retain it under the above provisional name. What is stated of this animal leads me to consider it as at least a permanent variety of *Mus rattus*.

[NOTE.—The following memoranda were made by Mr. Thompson, after

the foregoing remarks had been written. The two specimens referred to in these memoranda are now in the Belfast Museum.—Ed.]

"March 1st, 1850.—*Mus rattus?—M. Hibernicus.*—A very large rat of this species (large even for *M. decumanus*) was brought me to look at to-day, in the flesh. It was killed at Cogry Mills, near Doagh (County Antrim). Its weight is 1 lb. 3 oz.; it is a male. It is wholly black, except a white elongate marking, an inch and half long, upon the breast, and a little white on the toes.

	in.	lines.
Length from snout to base of tail	11	0
——— of tail, which is imperfect	8	3
——— head	2	8
——— ears	0	$10\frac{1}{2}$

"March 1st, 1851.—*Black Rat*, with white spot on breast.—A very fine one was sent me by Mr. Wm. Marshall, of Barn Cottage (near Carrickfergus); its weight, $13\frac{1}{4}$oz. avoirdupois."

The Brown or Common Rat, *Mus decumanus*, Pall.

This animal, although not aboriginal, is now, unfortunately, too well known to be much dwelt on. It is said to have been unknown in England before 1730 (Pennant, Jenyns, and Magill.); and not to have been introduced into Paris until twenty years later. Rutty, however, in his Natural History of Dublin, states that the species "first began to infest these parts about the year 1722." Its native country is not positively known.

White varieties of the common rat have occasionally come under the inspection of some of my correspondents, as well as of myself. In August, 1838, I examined an entirely white specimen, in the possession of a gentleman in Belfast, the eyes of which were of the ordinary black colour. Thomas Walker, jun., Esq., of Belmont (County Wexford), informed me, in 1837, that "white rats were rather common in the kennel there. They had pink eyes; but in shape and hair were different from the common rat; the body long and narrow; and the hair long and wiry, like that of a rough terrier."

At Holywood House (County Down), a pear-tree was pointed out to me, in June, 1842, from which, it was stated, about a bushel of pears had been taken by rats, in the previous summer. The branches were spread against the garden wall in such a position as to be easily accessible; and there was a rat-hole at the distance of about ten yards, with a well-beaten path leading to the tree. The depredators scooped out the inside of the fruit, leaving the rind; and did this leisurely, as the mangled remains were left at the foot of the tree.

Two of my friends, who have been in the habit of keeping ferrets, informed me, in 1849, that the presence of these animals did not deter rats from frequenting the places where they were kept. On one occasion (at Loughanmore, County Antrim), rats ate through two or three small wooden rails to get at the food of the ferrets, several of which were, at the time, lying at the upper end of the same box, about four feet from where the food was.

I have also been told that rats feed upon frogs' spawn, but cannot vouch for the fact.

John Sinclair, Esq., states, as the result of his examination of many broods of young rats, that a great proportion of them—not less than three-fourths—were males.

THE COMMON HARE OF GREAT BRITAIN, *Lepus timidus*, Linn.,
Is not found in Ireland.

THE IRISH HARE, *Lepus Hibernicus*, Bell.
THE ALPINE HARE, *Lepus variabilis*, Pallas.

The following paper was communicated by me to the Royal Irish Academy, in May, 1838, and was published in the Transactions, vol. xviii. part 2:—

"ON THE IRISH HARE (*Lepus Hibernicus*).—The Earl of Derby was the first to call the attention of English zoologists to the differences existing between the common hare of Great Britain and that of Ireland; and, for the purpose of having the matter duly investigated, he, in April, 1833, transmitted specimens of the Irish hare to Mr. Yarrell, who exhibited them at a meeting of the Linnæan Society. In the month of July, in the same year, this gentleman introduced the subject to the Zoological Society, at the same time pointing out some of the more prominent characters which distinguish the two animals. With regard to the specific difference of the Irish hare, Mr. Yarrell did not, on either occasion, offer an opinion. Mr. Jenyns, in his Manual of British Vertebrate Animals, published in 1835, introduced the Irish hare as a variety of the *Lepus timidus*, with the remark, that it 'might almost deserve to be considered a distinct species.' Mr. Bell, in his work on British Quadrupeds, completed in 1837, judging from external character, brought it forward, for the first time, as a different animal from the common hare of England. In a communication to the Magazine of Zoology and Botany for August, 1837, Mr. Eyton stated that, from an investigation of the anatomical characters of the Irish hare, he detected such differences as 'would probably distinguish it as a species distinct from the common hare, did no other characters exist' (vol. ii. p. 283).

"Having thus looked retrospectively to the Irish hare, from the first simple announcement of the characters in which it differs from the *Lepus timidus*, until from internal as well as external evidence it is considered specifically different, it may be thought unnecessary to treat further on the subject, but the sequel will, I trust, show that it has not yet been entirely exhausted.

"The very erroneous idea prevails in some quarters that the hare of Ireland was not known to differ from that of England, until the subject was introduced in London, in the year 1833. Respecting the former animal Mr. Bell observes, that 'it is certainly a very remarkable circumstance that it should have remained unnoticed until so late a period, and can only be accounted for by the fact that it is the only hare found in Ireland, and that therefore the opportunity of comparison did not frequently occur' (p. 342). The difference between the hare of Ireland and that of England and Scotland has, however, though not committed to the press, been long known in this country to the oldest sportsmen, dealers in animal skins, and such other persons as had the opportunity of examining them.* Yet, strange to say, to naturalists generally, what is here

* On account of the difference between these animals in the two countries, the late David Ker, Esq., upwards of thirty years ago, had some hares brought from England, and turned out on the largest of the three Copeland Islands, off the coast of Down, where, however, they did not much increase, and long since became extinct. About twenty years ago, a sporting friend, when visiting the Island of Islay, off the coast of Argyleshire, killed several individuals of the Irish hare, as well as of the indigenous one; and, on pointing out the former to some persons resident in the island, was informed that they were not any novelty, as the species had been introduced from Ireland by the chief proprietor of the island, but at what period I have not learned. It may be in reference to these that Daniel, in his Rural Sports, observes, with respect to the size of hares in different parts of the British Islands, that "the smallest are in the Isle of Islay." In a journal kept by that distinguished naturalist the late John

quoted from the British Quadrupeds correctly applies; the subject having been, for the first time, introduced to the scientific world at the period to which allusion has been made.

"With the club of the Linnæan Society I happened to dine upon the day on which the specimens were received from Lord Derby (then Lord Stanley), and on the evening of which the subject of the Irish hare was first brought forward. On being questioned by the chairman, I had then the pleasure of stating, as a fact well known in the North of Ireland, all the external and likewise the culinary differences * existing between the hares of the two countries; but, at the same time, added, that we regarded the hare of Ireland only as a very distinct and well-marked variety of *Lepus timidus*. Further than this, as has been already noticed, Mr. Yarrell and Mr. Jenyns did not go, Mr. Bell being the first to characterize it as a species.† That it really is such, I became at once satisfied, on a very minute examination of Scotch and Irish specimens towards the end of 1833. About this time my friend, Mr. Yarrell, requested from me the fullest information on the animal, preparatory to his drawing up a paper on it, and for him such facts as I was conversant with were reserved, knowing, as I did, that in such truly able hands the subject must be judiciously treated. In furtherance of the inquiry, I had, at that time, the pleasure of transmitting him a specimen of the animal, and of presenting others to the British Museum. In consequence of Mr. Yarrell having now relinquished this intention, I am induced to bring together here such particulars of the history, &c., of this animal as are known to me.

"In consulting the Mammalogie of Desmarest, and Synopsis Mammalium of Fischer, the two latest general works upon the subject, I find that there is not any species of *Lepus* described, corresponding to the hare of Ireland, nor is there such in any other work to which I have had access. The species known on the continent of Europe are but two in number, both of which, the *Lepus timidus* and *Lepus variabilis*, are natives of the British Islands. Between these species only, and the hare of Ireland, does it seem necessary to draw any comparison. Considered in connexion with them, it holds, in several points of view, both as to form and colour, such as the relative length of ears to head, length of tail, in assuming a white garb (though not periodically), &c., an intermediate place. The habits of the Alpine hare, together with the localities to which it is restricted, are very different from those of the Irish species; the latter animal, in these respects, exactly agreeing with the *Lepus timidus*.

"Specimens of the hare of Ireland and of Scotland, from the approximating counties of Down and Wigton, and examined in a recent state, presented the following differences:—‡

Templeton, in which criticisms on the works he read and observations on passing events, as well as on objects of natural history, are recorded, I find the following note under date of Jan. 10, 1807. With reference to the different quality of the fur in hares mentioned in Lessep's Travels in Kamtschatka, it is remarked —"It is known that the Scotch hares have a fine wool fit for making hats, while the fur of the Irish hare is not accounted of any use."

* The Scotch and English hares are, at every age, and for all culinary purposes, generally esteemed superior as food to the Irish.

† In the article "Hare," published in the British Cyclopædia of Natural History (1836), it is likewise so mentioned,—vol. ii. p. 705. In a note contributed by the late E. T. Bennet, in his edition of White's Selborne (1837), it is remarked that "Ireland has also its peculiar hare,"—p. 128.

‡ The males were obtained in February; the females in December. The latter are in both species generally larger than the males.

	Irish Hare.				Scotch Hare.			
	Male. Weight, 5lb. 3oz.		Female. Weight, 7lb. 4½oz.		Male. Weight, 6lb. 8oz.		Female. Weight, 6lb. 9½oz.	
	in.	line	in.	line	in.	line	in.	line
Length of head and body to upper base of tail	20	0	24	6	22	6	21	0
— from nose to point of middle claw of hind-leg when stretched out	27	2	...	...	30	0	...	...
— of head, measured with compasses	4	8	...	...	4	9	...	...
— of head, from anterior base of ear, measured as last	...	...	4	0	...	...	4	0
— of head from forehead, on a line with anterior base of ears, following its curve to the nasal slit	5	0	5	0	5	0	5	0
— of ears posteriorly, including fur	4	5	...	...	4	9	...	...
— of ears, from anterior base	4	2	4	3	4	1*	4	10
— of tail, including hair	...	...	4	0	4	3	5	0
— of tail, to end of fleshy portion	2	0	2	6	3	0	3	6
— of whiskers	3	6	3	6	4	0	4	6
— from shoulder, in a straight line, to end of hairs which extend a little beyond middle nail	14	0	...	...	13	0	...	...
— from sole of fore-foot to back, in a straight line	...	...	12	0	...	...	11	0
FORE EXTREMITIES.								
Length of radius	4	1	4	9	4	2	4	9
— from carpel joint to end of middle claw	2	9	3	3	2	9	3	1
— of middle toe and claw	1	5	1	7	1	4	1	4
HIND EXTREMITIES.								
Length from knee-joint to end of middle claw, in a straight line	11	0	10	3	10	9	11	0
— of tibia	5	0	6	0	5	4	6	0
— of heel to point of middle claw	5	6	5	6	5	1	5	0

COLOUR OF IRISH HARE.

(*Female Specimen.*)

Top and sides of *head* of a tolerably uniform dull reddish-brown, except an oval spot just before the eye, and of about its size, being somewhat paler, and close round the eye, where it is very dull white; of this colour also is the under surface of the head.

Ears presenting anteriorly a mixture of black and reddish-grey; posteriorly greyish, becoming gradually paler to the margin, which, for two-thirds from the base, is white; extreme tip (about six lines) black, which colour extends down the posterior margin for about one-third the length of ear.

Back and upper portion of *sides*, dull reddish-grey; under surface of *neck*

COLOUR OF SCOTCH HARE.

(*Female Specimen.*)

Upper surface of *head* dark-reddish brown; a white spot about the size and form of the eyes just before them; a whitish mark originating at anterior point of upper surface of the eye, becoming broader posteriorly, and extending more than half way from the eye to the base of the ear.

Ears presenting anteriorly a mixture of black and reddish-grey; medial portion pure reddish-brown, which colour does not appear in the ears of the Irish species; posteriorly, from base, for about two-thirds their length, whitish, thence to tip black, of which colour a narrow marginal line extends downwards to middle of ear.

Back and upper portion of *sides* mottled with a pale-reddish colour and

* Another male of this species, and of similar size, examined at the same time, had the ears thus measured—four inches two lines in length.

pale grey; *lower parts*, from between the fore-legs to tip of tail, white, except at inner base of hind-legs, which are of a very pale grey; upper portion of *tail* * white, with a few black hairs towards the base, giving that part a sullied or impure tinge.

Fore-legs dull reddish-brown in front and outer sides; inner and hinder portion white, which colour comes forward transversely on the outer sides of the legs, just above the foot, which is brown. Sides of *hinder legs* greyish, tinged anteriorly with yellowish-brown; of this colour a stripe extends from the tarsal joint to the middle toe, and is bounded on both sides by white; entire base from tarsal joint to toe-claws dull greyish-brown, inner portion of same part whitish; this varied marking more or less conspicuous in different individuals.

Lips greyish; *whiskers* uniformly white or black, or of both colours; *irides* dark hazel.

black, the former predominating; towards the lower portion of the sides the pale reddish-brown, or rich cinnamon colour, only appears, and this alone prevails on both sides of the *neck*, and on its lower portion; entire *under surface*, from between the fore-legs to the tip of tail, white, except at inner base of hind-legs, where a pale cinnamon colour prevails.

Fore-legs dark reddish-brown in front and outer sides; inner and hinder portion a very pale red and white intermixed. *Hind-legs*, to tarsal joint, of a grey and very pale red combined; from thence to middle toe reddish-brown, which colour becomes gradually paler posteriorly; inner portion of same part whitish.

Lips blackish; *whiskers* uniformly white or black, or of both colours; *irides* dark hazel.

"From this comparative description it appears that the *Lepus timidus* displays greater diversity of colour in the head, ears, and body, than *Lepus Hibernicus*, and that the latter exhibits greater variety in the disposition of colours on the legs.

"On looking to the visceral anatomy, along with my friend, Dr. J. L. Drummond, the following measurements were made:—

	Irish Hare.		Scot. Hare.	
	Male. Weight, 5lb. 3oz.		Male. Weight, 6lb. 2oz.	
	feet	inch.	feet	inch.
Length of small intestines from stomach to cœcum	12	10	14	0
— of cœcum from termination of the ileum	1	6¼	2	0
— of colon	4	5	4	8
— of rectum	3	0	3	0

"In the following table, a comparative view is presented of the osteological characters of the two species:—

* It is singular that this, the most obvious of all the differences in colour between the two species, should have been quite unnoticed by the several authors who have written on the Irish hare, more especially as the colour of the tail is always one of the few leading characters given of *Lepus timidus*, both by British and continental authors. On questioning some of the Belfast dealers in hares as to their means of knowing the two species, I found that the difference of colour in the tail was one of their marks of distinction—with every external character, indeed, they are, and always have been, quite familiar.

	Irish Hare.				Scot. Hare.	
	MALE. Original Wt. 5lb. 3oz.		FEMALE. Original Wt. 7lb. 4½oz.		FEMALE. Original Wt. 7lb. 4oz.	
	in.	line.	in.	line.	in.	line.
Length of head	3	6	3	8	3	9
Breadth of head above the meatus auditorii	1	2	1	1½	1	1
— at the zygomata	1	9	1	10½	1	10½
Distance between the superciliary ridges	1	2½	1	3	1	2½
Length of humerus	3	9	3	10	3	10
— of radius	3	10	4	0½	4	3½
— of ulna	4	7	4	8½	4	11
— from base of radius to lower extremity of metacarpus	1	4	1	6	1	6
— of second finger and nail	1	4	1	8	1	7
— of femur	4	6	4	8	4	10½
— of tibia	5	1½	5	3	5	7
— of os calcis	1	2	1	2	1	2
— from base of os calcis to lower extremity of metatarsus	2	4	2	3	2	5
— of second toe and claw, measured in a straight line	1	10	2	1½	2	0
— from upper extremity of os calcis to lower extremity of metatarsus	3	7	3	6	3	6
— of scapula	2	10	3	2	3	2
Breadth of scapula	1	6	1	10½	1	10½
Length of pelvis	3	4	3	7	3	10½

"This table, which exhibits a comparison of two female specimens of equal size and weight, shows a very different result from that arrived at by Mr. Eyton, who observes, that the skeleton generally of the Irish hare is larger than that of the English; that the lateral processes of its lumbar vertebræ are longer, its scapula and ribs broader, and its cranium* larger; but in all these characters an equality is presented by the individuals under consideration.† Mr. Eyton further adds, that the Irish is distinguished from the common hare by 'the greater length of the humerus, in proportion to that of the ulna;' but in these individuals the humerus is equal and the ulna of the *Lepus timidus* of superior length. As remarked by Mr. Eyton,—'in the numbering of the vertebræ and ribs (twelve in number) they do not differ, except as to the caudal ones, which in the Irish hare are thirteen, and in the English sixteen; the sacral in both are four, the lumbar seven, the dorsal twelve, and cervical seven; making the total number in the Irish hare forty-three, and in the common hare forty-six.' The teeth appear in all respects similar in both species. The orbits are somewhat more of an oval form in the Irish than in the common hare.

"The most obvious characters of *form* between the common and Irish hare are the superior length of ears and tail,‡ and the less rounded head of the former animal: those of *colour* have been before noticed. The *specific characters* I pro-

* Although this can hardly be called larger, there is some difference in form between it and that of *Lepus timidus*.

† Although the lumbar vertebræ are not in reality longer in the Irish species, yet from taking a more horizontal direction they so appear when the animal is viewed with its head towards the spectator.

‡ The greater length of these parts gives an erroneous idea of superior size to the *Lepus timidus*, when there is an equality in the length of its head and body, and in weight. Mr. Bell and Mr. Eyton, judging, it may be presumed, from the individuals examined by them, describe the Irish as larger than the common hare; but the difference in size is, I consider, dependent on locality, as both species differ remarkably, in this respect, in the barren and mountainous parts of the country, and in the rich demesnes of the valley, where they are protected. In general, I should say the *Lepus timidus* is the larger animal.

pose for the Irish hare are: *Fur above uniform dull reddish-grey; tail whitish above; ears and tail shorter than head.*

"The description of colour which has been drawn up does not apply to the Irish hare at every age, and here is an important difference between this and its approximate species. The *Lepus timidus* sometimes, though rarely, becomes white, like various other animals; the *Lepus variabilis* annually appears so at the beginning of winter, throughout which it so continues. The *Lepus Hibernicus*, on the other hand, assumes this colouring with age. This inference I was at first inclined to draw from the fact, that it was only in preserves, or where they were unmolested, that I remarked them to be parti-coloured, or almost pure white; their enemies, where they are not protected, being so numerous, as to prevent the attainment of their natural term of life.* To the same effect I have the evidence of Mr. Adams, a most intelligent gamekeeper, who states, that hares turned out young into a demesne, in the County of Down, and marked by a piece being taken out of their ears, regularly became white in the hinder parts, during the fifth spring; in the sixth, this colour extended over the sides; in the seventh, they were all white but the head; and in the eighth, he thinks pure white. In all these stages but the last they have occurred to myself. In a park, in the County of Antrim, he has made similar remarks, though without the precise *datum* afforded in the first instance. Here he judges from hares frequenting particular haunts gradually presenting the white appearance just described, and which I am inclined to believe is occasioned by a change of colour in the existing fur. About the month of February, the whiteness of garb exhibited from the fifth to the eighth year begins to appear, and is borne through March and April, when the annual change of fur takes place, and the white is thrown off for that of ordinary colour.

"In the Belfast Museum, there is a specimen (from Shane's Castle-Park, County of Antrim) which retains the ordinary colour only on the upper portion of the head and front of the ears, the tips, as in the Alpine hare in winter garb, retaining their blackness. The entire of the remainder, except a small portion at the base of the fore-legs, tinged with pale fawn colour, appears of a pure white; but, on close examination, exhibits along the back, and on the breast, unchanged in colour, some long black hairs;† the lips are whitish.

"Within one week, in the month of October, 1829, I had the opportunity of observing the three species of British hare in their native haunts; the *Lepus Hibernicus* about Belfast; the *Lepus timidus* towards the base of the higher Grampians, at Glenlyon, in the north-west of Perthshire; and the *Lepus variabilis* about the summits of the same noble mountains. Of the Alpine hare, some individuals, which were killed in the last week of this month, had not, in any degree, changed the colour of their dark summer fur, whilst, at the same time, others were almost entirely white.‡ The motion and general appearance of these animals, when not much alarmed, their place of refuge being at hand, seemed intermediate between those of the common hare and rabbit; but when they had wandered from the summits of the mountains, where no sheltering crevices of rocks were nigh, and their strength was put forth by the pursuit of the shepherd's dogs, they exhibited very considerable speed.

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* In the note by Mr. Bennet, of which part has been already quoted, it is remarked, but without any reason being assigned for it, that the Irish hare is "apt to become white, in winter, when kept in parks or other enclosures," p. 128.

† These "long hairs," which have been described as altogether wanting in the Irish species, exist in every specimen I have examined, but are extremely few in number, compared with those in the common hare.

‡ Although I am well aware that there is often a considerable difference in the period at which individuals of the same species put on such a change, yet I would suggest to the attention of persons who have the means of investigation, to ascertain whether the Alpine hare be white, in winter, from the first year of its existence.

"The *Lepus Hibernicus* is, in a wild state, easily distinguished from the *Lepus timidus*, by its shorter ears, differently coloured fur, and by the whiteness of the upper surface of its tail. The last-named distinction can rarely be observed except in parks where the animals are preserved, and where, admitting of a near approach, they move gently off; but in such places the difference is very obvious.

"Some sporting friends, who, from coursing much, both in Ireland and Scotland, have had ample opportunities of observing the difference between the two species before greyhounds, consider that in an open country the Irish hare goes off faster from the dogs than the Scotch, and is thus less likely to be killed at the first dash: in other respects their speed is equal. This was remarked in similar ground in both countries, and with the same greyhounds. It has likewise been stated by these gentlemen, that, when wounded by the gun, the Scotch is more easily captured than the Irish species. It is probable that under both circumstances the difference may be owing to the hare in the Irish counties, in which my friends sport, being more persecuted, and consequently more on the alert against her enemies; and I speak from personal knowledge of both countries.

"With respect to the points of economy to which allusion has not already been made, and to habits generally, there is a very great similarity between the two species. Thus the places selected for the 'form' are the same, as are those for the reception of the young; the number of the latter, except in extraordinary cases, being four or five. By intelligent gamekeepers both are considered to produce five times in the course of the year. When the parent has been killed, I have seen the young extracted with their eyes full open, and within the first hour of their untimely birth able to run about. Towards the end of their third week, the leverets are said to be independent of their parent; and at this time, what Daniel, in his Rural Sports, remarks of the English hares, equally applies to the Irish,—that 'when we meet with one young hare we are almost certain of finding more within a small distance.'

"The Irish hare changes its quarters according to the weather, leaving situations exposed to cold winds for more sheltered places.

"In the choice of food I am not aware of any difference between the two species. In the severity of winter, when the Irish hares betake themselves to the flower-garden, the delicate leaves of the pink or carnation are especial favourites; in the kitchen-garden, parsley and the more tender varieties of cabbage, young plants of the cauliflower and broccoli being preferred to any of the coarser kinds; and in young plantations, consisting of an average number of species of deciduous forest trees, I have particularly remarked their predilection for the oak, not another species being touched until the whole of these had been first barked.

"Mr. Bell observes that the English hare 'swims well, and takes the water readily, not for the purpose of escaping from pursuit merely, but for the sake of obtaining a plentiful supply of food.' This applies equally well to the Irish hare, with the exception of the last clause of the sentence, for which I cannot vouch, though I have no doubt of its accuracy also, a friend, when quietly angling, having once observed a hare, that was quite undisturbed, enter and swim across a deep pool of a mountain-stream, though by going a very short way lower down she could have passed in the usual manner.

"When collecting marine productions, in company with Mr. Hyndman, about the entrance to Strangford Lough, in January, 1835, we, at different times in one day, started two hares that were lying very far out upon low rocks, upon which marine plants only vegetated; and had one of them remained undisturbed for only a few minutes longer, she would, without resorting to swimming, have been cut off from the mainland until the tide had ebbed, the rocks being insulated for at least the half of every twelve hours.

"Were such instances as the one mentioned of the hare swimming across the stream, rather than go a short way about, general (which they are not asserted to be), it would seem that, when undisturbed, this animal has less aver-

sion to swimming than to leaping, as, by his disinclination to the latter exertion, by far the greater portion killed in the higher grounds of Ireland fall victims. When a few stones are removed from the base of the loose mountain-walls, though their entire height be very inconsiderable, the hare will take advantage of the opening, rather than leap the wall; a habit so universally known, that by snares placed in these apertures they are easily secured, and chiefly when going to, or returning from, their feeding ground. On this habit a difference was observed by a person employed as gamekeeper in the neighbourhood of Belfast, and who had previously served in the same capacity in Scotland. This man remarked, with some surprise, that in a field where hares were generally numerous, and which was separated from a plantation where they were preserved by a mill-race, over which was a wooden pipe, that they invariably, when disturbed, ran for and crossed over it, rather than leap the race, which the Scotch hare would have done. Although it has been thought proper to mention such trivial facts, yet no stress is laid upon them, as we find many animals very much influenced by immediate circumstances.

"In the descriptions of the *Lepus timidus* I have read, there is not any notice of their herding together, when numerous; but the intelligent gamekeeper before alluded to states, that in Northamptonshire he has frequently seen them, when driven out of a plantation, congregate together, to the number of about thirty, in the open ground. Where the Irish hares abound, their gregarious propensity is a marked character. In several demesnes in the North of Ireland, when they were carefully preserved, they, on becoming plentiful, herded together like deer, and thus have I repeatedly seen from one to three hundred moving together in one body like these animals. In all these demesnes they eventually increased to such an extent as to prove most destructive to the plantations, &c., and were consequently destroyed in great numbers; from a demesne in the County of Down they, on several occasions, have been sent into Belfast by the cart-load. This herding together is not the result of what might be perhaps considered semi-domestication in the demesne or park; as, in a perfectly free and wild state, when permitted to increase, they exhibit the same social and gregarious habit." *

After the preceding paper was written, I had opportunities—in the month of September, 1842, spent in shooting-quarters, at Aberarder, in Inverness-shire—of occasionally meeting with the Alpine hare on the mountains, and of examining several individuals which were shot; and I subsequently saw numbers of them in Aberdeen and Edinburgh.

In these specimens I could not perceive any material difference in form from that of the Irish hare; and the dissimilarity in colour consisted only in a different shade of grey. This I did not consider of any value as a specific character, having observed that the general hue of the Alpine hares varied in Scottish localities at the same season, and that the bluish-grey tint was sometimes assumed by the Irish hare. In the succeeding winter I examined, osteologically, specimens from Scotland and Ireland, and found no greater differences than I had seen existing between Irish

* "A sporting gentleman of my acquaintance for seven or eight years kept a number of native hares in a large yard in the town of Belfast, chiefly for the purpose of keeping up a sufficient supply for his hunting-ground, and in this he was, from the first, successful, as the females produced three times in the year. The males, perhaps from an undue proportion relatively to the females, fought so violently, that, for the sake of peace, a few of them were emasculated, and, in consequence, grew to an amazing size. The same gentleman kept one of these hares for several years, fastened, like a dog, by a chain and collar. Those which had their liberty in the yard (which was extensive) never became tame; but when taken young, and pains are bestowed upon them, they exhibit considerable docility, and have been taught to play tricks, such as to beat a drum, &c."

specimens contrasted with each other. At the meeting of the British Association, held at Cork, in 1843, I briefly stated the foregoing circumstances, as noticed in the report of that year's proceedings (p. 68 of Trans. of the Sections), from which the following is extracted:—

"Mr. Thompson exhibited specimens of the Alpine hare (*Lepus variabilis*) from the Highlands of Scotland, and of the hare of Ireland (*Lepus Hibernicus*), for the purpose of showing that the species are identical. Of this fact he, judging from the external characters, satisfied himself last autumn, when in the Highlands of Scotland, and subsequently proved it, by a comparison of the anatomical characters of the two supposed species."

The difference in habit between the latter is certainly very remarkable, and will, by some naturalists, be considered sufficient to mark them as distinct—the one being generally an Alpine species, and the other being distributed over Ireland, from the sea-side to the mountain-tops—but without a marked difference in structure I am not content to note them as distinct.

A female Alpine hare, shot at Aberarder, on 21st September, 1842, and which I had preserved, weighed 6 lb. 2 oz. One shot next day weighed 6¼ lbs. These hares had no appearance of whiteness in their fur; nor had others which I saw in the market of Aberdeen, in the first week of October. Their colour was dark bluish-grey. The keeper at Aberarder said that the Alpine hares are often larger than the specimens I have referred to; and that in winter he sees them everywhere over the actual mountain-ground, but never on the plain, though it is but a step from the one to the other. I have, however, been assured by Mr. Simpson, who had charge of a sheep-farm for several years, in the south-east of Caithness, that he often saw Alpine hares in the turnip fields in the low grounds.

When in the Isle of Skye, in 1850, I found that the Alpine hare (*L. variabilis*) was not known to exist there. The *L. timidus* had been introduced to parts of the island.

In the work of A. G. Keyserling and Professor J. H. Blasius, upon the vertebrate animals of Europe ("Die Wirbelthiere Europas, von A. G. Keyserling and Professor J. H. Blasius, Erstes Buch, 1840"), it is remarked that *Lepus Hibernicus* (Bell) is, according to the statements given up to the present time, not different from the summer garb of the *Lepus variabilis*, and does not become white in winter:—"Anmerk. *Lepus Hibernicus*, Bell, Brit. Quad., p. 341, ist nach den bisherigen Angaben von der Sommertracht des *L. variabilis* nicht unterschieden; sol in winter nicht weiss werden." In that part of the work devoted to specific characters, pp. 30, 31, *L. variabilis* and *L. timidus* are included, but the term *Hibernicus* does not occur.

For these particulars I am indebted to my friend Mr. Yarrell.

With reference to the degree of importance which should attach to the variations of *colour* observable in Alpine hares, the following remarks of Mr. Bell (Brit. Quad. p. 346) should be borne in mind. Speaking of the Alpine hare, he says:—"I have retained the name *variabilis*, given to this species by Pallas, although that of Brisson, *albus*, has the priority. The latter name, however, could not, with propriety, have been retained, as it refers to a character which is only inflicted upon the animal by circumstances connected with climate and temperature; *there can be no doubt that, were it to remain in a mild temperature during the winter, the white colour would never appear:* as is, indeed, proved by the fact, that when the winter is unusually mild, the coat never assumes a pure unmixed whiteness." The same author describes the Irish hare as "of a

uniform reddish-brown colour on the back and sides." I have already shown, however, that it is subject to considerable variation in this respect, and I have now to add the following memoranda on the same subject:—

Mr. R. Davis, in a communication dated 9th September, 1837, informed me, that on the 4th of April, in that year, a hare, "of almost a pure white colour," was killed near Mitchelstown. "The face, under side of paws up to knee, and a few very small spots on each side, were of the natural colour, and a number of dark grey hairs occurred along the middle of the back." On the 9th Feb., 1842, the same gentleman, writing from Clonmel, added, "I got this day a hare with the lower half of the back, and a patch between the ears, white, and the other parts of a much lighter colour than ordinary. Hares seem subject to much variety of colour." During the second week of February, 1842, I saw about half a dozen hares from Shane's Castle-Park (County Antrim), which were partly white, especially the hinder portions, and about the head and ears.

Richard Chute, Esq., of Blennerville (County Kerry), remarked, in notes which he supplied to me some years ago, that he had, during one winter (about 1842) observed a great number of white hares in that county, owing, as he supposed, to the severity of the season. He had remarked them to be much whiter in some years than others, as, indeed, I have myself done. This does not accord with my theory, that the whiteness is assumed with age.

About the middle of January, 1845, Edmund M'Donnell, Esq., of Glenarm Castle (County Antrim), presented to the Belfast Museum, in a fresh state, the whitest Irish hare I have ever seen—even whiter than a winter Alpine one obtained in the same season. It was killed on his grounds. Mr. M'Donnell stated that this hare had been for some time known to the people of the district in which it lived, and that they had abstained from injuring it, not on its own account, but because they considered that it would be *unlucky* to do so.

On 8th March, in the same year (1845), J. Crichton, Lord Roden's gamekeeper, at Tollymore Park (County Down), gave me the following information:—"We have a great number of white hares on the mountain; some of them snow-white."

In December, 1847, Mr. G. C. Hyndman saw a white hare at Massereene deer-park (County Antrim). He was informed, in reply to his inquiries, that it had been first observed during the previous winter, and had assumed in spring the ordinary brown colour, though of a rather lighter shade, so as to individualize it amongst others. It frequented the same place, and its identity was, therefore, unquestioned.

A hare which was entirely of a sooty black colour was seen by Mr. J. R. Garrett, in the shop of Mr. Glennon, taxidermist, Dublin, in January, 1850. It had been recently sent from the County of Kildare to be preserved.

Fleming and Bell have described the lips of the Alpine hare of Scotland as being always *black*. My own observations, however, accord more closely with those of Mr. Macgillivray, viz.—"lips and chin brownish-white."

Rutty, who published his Natural History of the County of Dublin in 1772, was aware of the difference in quality between the furs of the English and Irish hares. In vol. i. p. 280 of that work, he says:—

"*Lepus—The Hare.*—The finer and under part of the hair, next to the skin, is used in making hats, being mixed with rabbits' hair, and the wool of *vigogne*,

from Peru; and it is exported, though reckoned far inferior to the English, and fit only for the coarser hats."

In 1843 I was informed by a friend resident in Glasgow that the skins of the common or lowland hare (*Lepus timidus*) were worth, in that city, fivepence each, while those of the Alpine hare (*Lepus variabilis*) were only worth twopence each. As an article of food, also, the Alpine species was considered much inferior, being not "gude for soup, but puir fusionless things!"

The following paragraph, which I extract from The Glasgow Herald, of 19th January, 1849, shows how this species may increase in numbers, when undisturbed:—

"*White Hares.*—A landed gentleman connected with this county, but at present located in a different part of Scotland, says,—I have not yet seen noticed in any of the journals the immense increase of white hares which has taken place within a year or two on the Grampian mountains. A few days since, a gentleman of my acquaintance told me that it was no uncommon occurrence to see five or six hundred of them during a single day's sport. Near the close of the grouse season, a friend who has shootings on the Earl of Airlie's property, amidst the fastnesses alluded to, went out for the purpose of killing a few brace of birds. I believe he found muirfowl very scarce; but during the lapse of two hours he shot twenty-eight white hares, and, if inclined, might have easily trebled the number. Unlike the furred game of a different colour, the white mawkins, when started from their forms, make a circuit, and then return to the spot previously quitted—a great advantage, of course, to sportsmen aware of this peculiar habit. From fecundity in breeding they have become vermin, and as such very annoying to the shepherds, some of whom won not far from the sheep-walks where old Norval of yore 'fed his flocks, a frugal swain.' Their gluttonous powers are further complained of; and, as they uniformly reive the best of the pastures, competition so formidable is expected to tell on the condition of the hirsels, when marketing time comes round. Feathered game shun the haunts where the reivers congregate; and parties, I know, who have shootings adjoining, one and all declare they can get nothing now but white hares."—*Dumfries Courier*.

The usual number of young borne by the Irish hare seems to be three; but I have learned from two gamekeepers, on whom I can place reliance, that they have, although rarely, observed four. And my friend Thomas Sinclaire, Esq., on one occasion, in the month of May, took six young ones out of an Irish hare, which weighed 8 lb. before being opened.

The following note on "remarkable change of habit in the hare" appeared in the Ann. Nat. Hist. vol. v. p. 262:—

"*April* 22, 1842.

"My Dear Lord,—I send you the story of the hares I told at Florence Court. Major Bingham is the proprietor alluded to; and my father related the story, in a lecture for the Zoological Society on the instinct of animals.—Most truly yours,

"S. G. Otway.

"To the Earl of Enniskillen."

"A considerable landed proprietor has a large tract of sandhills within the mullet, which tract (open as it is to all the Atlantic storms) has been found to have been greatly impaired by the introduction of rabbits, who, by their burrowing and disturbing the bent-grass, gave facilities to the wind to operate, and so the sandhills were, year after year, changing their position, encroaching on the cultivated ground. To remedy this, he determined to destroy the rabbits, and, in their place, introduced hares, which, he knew, or thought he knew, would not burrow; but here he was mistaken; for the animal soon found that it must leave the district, or change its habit; for if, on a winter night, it attempted to

sit in its accustomed form, it would find itself buried, perhaps twenty feet, in the morning, under the blowing sand, as under a snow-rath. Accordingly, the hares have burrowed; they choose out a thin and high sandhill, which stands somewhat like a solidified wave of the sea. Through this Puss perforates a horizontal hole, from east to west, with a double opening; and seating herself at the mouth of the windward orifice she there awaits the storm; and as fast as her hill wastes away she draws back, ready at all times to make a start, in case the storm rise so as to carry off the hill altogether."

THE RABBIT, *Lepus cuniculus*, Linn.,

Is common over the island.

This animal passes under the names of *burrow* and *bush* rabbit, in the North of Ireland: the former term being applied to those which burrow in the ground, in the ordinary manner; and the latter, to such as live in "forms," like the hare, among bushes or underwood. Dr. R. Ball informs me, that he has long been aware of the difference of habit and appearance between burrow and bush rabbits, in the County of Cork; and the Rev. G. F. Dawson, in a short communication published by him in the "Zoologist," vol. iii. p. 903, refers to the *bush-rabbit* or *stubb-rabbit*, as distinguished in Bedfordshire. The departure from their usual habits is, I conceive, only resorted to by rabbits where the soil is unsuited to burrowing.

My friend Mr. W. Ogilby informs me that he has frequently, in the North of Ireland, witnessed the partiality of both hares and rabbits for Swedish over other kinds of turnips, the former being selected even when a field of the latter intervened.

Captain Kennedy, of Finnart (Ayrshire), told me, in 1843, that, within twelve months, upwards of four thousand rabbits were killed on his property there a few years previously. All the rabbits I saw (about a dozen) one evening, in driving through Glenappe, and on Captain K.'s property, were jet black.

Howitt, in his "Book of the Seasons" (August), describes a fight, witnessed by him, between a rabbit and a large weasel, in which the latter was worsted. He supposed that it had been intending an attack on the young rabbits in the burrow, when it was met, several times, by the parent, and repelled.

Mr. W. Darragh (Curator of the Belfast Museum) once had a domesticated male rabbit, which not only partook of cooked flesh-meat, but greatly preferred this food to any vegetables; it was in the habit of watching for a bone, just as a dog would do, and of gnawing it in like manner, when obtained. This rabbit evinced no fear of dogs or cats; and was so courageous as to attack any one who pointed a finger or stick at it. It showed great fondness for music, stationing itself close to the performer, and sitting erect in a very ludicrous attitude.

THE RED-DEER, *Cervus elaphus*, Linn.

"Oh, Forest-king! the fair succeeding morns
That brighten o'er these hills shall miss your crest
From their sun-lighted peaks!" *

This species, once abundant over Ireland, is now confined to the wilder parts of Connaught, as Erris and Connemara; and to a few localities in the south, more especially the vicinity of the Lakes of Killarney.

* Lines applied to the red-deer, in Mrs. Norton's "Child of the Islands."—*Autumn*, Canto ix.

When on a tour through the West and South of Ireland, in the summer of 1834, I was informed that there were, at that time, only twenty-five red-deer in Connaught—thirteen of these in Connemara, and twelve in the barony of Erris. My informant added, that, in the previous year, two full-grown animals (one a stag) were shot with one ball. Dr. Harvey, in a letter dated 6th October, 1840, remarked, in reference to this species, that it "was, and, I believe, still is, in small numbers in the Galtee mountains, County Tipperary."

Mr. George Jackson, Lord Bantry's gamekeeper, at Glengariff, stated, in a communication which I received from him in February, 1850, that there were still some red-deer there, which were encouraged as much as possible.

In Payne's "Brife Description of Ireland" (1589), already quoted, we learn that a person might buy "a fat Pigge, one pound of Butter, or ii. gallons of new milke, for a penny; a *reede deare, without the skinne*, for ii s. vi d.; a fat Beefe for xiii s. iiii d.; a fat mutton for xviii d."

"The Co. of Maio * * * is rich in cattle, deer, hawks, and honey."—Camden's "Britannia" (Gough's edition), vol. iii. p. 585.

In the same work (p. 644) it is stated, that the mountains adjacent to Lough Esk (County Donegal) "abound with *red-deer*."

The following extract is from a report of a meeting of the Geological Society of Dublin, held on 8th November, 1843:—

"Mr. C. W. Hamilton submitted to the notice of the society a magnificent series of the horns of the red-deer (*Cervus elaphus*), from Ballinderry Lake, County Westmeath. One pair of gigantic proportions, having nineteen tynes, possessed also the unusual quality of being, in huntsman's parlance, 'Doubly Royal,' or giving indication of a double palmation near their terminations;—an occurrence of a rare kind, and the result of very advanced age in the animal. The lake in which these interesting remains were found is marshy and shallow; and when, on a bright day, the tourist gazes down into the clear water, he sees beneath him, protruding from the sedgy bottom, not the 'Round Towers of other days,' but the proud antlers of the ancient and lordly red-deer, as much an object of wonder and admiration as those structures of human hands which have outlived the ruin of empires. Projecting into the lake is a low promontory of marshy land, the soil of which, when turned up by the spade, is found to contain vast numbers of antiques, both of stone and bronze, as well as bones and teeth, with fragments of the horns of the red-deer. At either side of this promontory is a row of massive piles or stakes, extending into the lake, below its surface, and converging to a point somewhere about its centre. These subaqueous stakes can be traced until the deepening of the water blots them from the view. From the fact of the antiques being found associated with the remains of the deer, it is clearly proved that these animals were coëval with the earlier settlers on our island, who used the bronze, which has been considered as similar to that ascribed to the Phœnicians. From the appearance of the stakes extending into the lake, Mr. Hamilton proposed an ingenious theory to account for the accumulation of the bones. He supposes the double row of these piles to have formed a snare, used by the early hunters to entrap the deer; and their making it extend into the lake was a mode of construction induced by a long practical experience of the fact, that these animals are much more easily subdued when immersed in water, while swimming, than when encountered on land, even though attacked by that powerful breed of dog then existing,—the Irish hound. The stakes were probably at first elevated above the level of the water, but have been decomposed by the action of the atmosphere and other causes. In the same way, supposing a numerous drove of animals, congregated by a cordon of hunters, to the margin of the lake, and driven into its treacherous waters, many would be destroyed by drowning; and their carcasses, sinking to the bottom, would, after a time, be decomposed, and their bones and antlers be entombed in

the mud; others might be captured, and the most useful portions of the animals reserved for food, while the head and horns would be either buried, or flung into the ever ready waters; others, again, would be feasted on by the well-appetized hunters, and the refuse thrown away. Suppose a recurrence of such scenes, through the lapse of perhaps ages (for this locality may have been a favourite resort of the huntsmen), and such an accumulation of bones, horns, and antique ornaments, as at present found, is easily accounted for."*

In December, 1847, I got a very fine horn of the red-deer, dug out of solid sand, four feet beneath its surface, in the excavation then being made for a new channel in Belfast harbour. Other horns of the same species were also found there about the same time. The cut was made in the line of what was supposed to have been the original channel of the river Lagan.

The Fallow-Deer, *Cervus dama*, Linn.

Smith in his History of Kerry notices herds of fallow-deer as frequenting the "mountains" in that county. These being the haunts not of this animal, but of the stag or red-deer (*C. elaphus*), the latter was probably the species alluded to, especially as in the index to the volume appears "deer, red or fallow." For a long period the fallow-deer certainly has not been found in any part of Ireland where it could be called truly wild.

A horn of this species which I possess (through the kindness of Edward Benn, Esq., of Glenravel, County Antrim) is stated to have been dug up from a considerable depth in a bog, in his neighbourhood, but minute particulars respecting it could not be obtained. It may not be out of place to observe here, that the *C. dama* is now well known to inhabit Greece, in a wild state. Lord Derby for some years possessed a pair of these animals, of the common spotted variety, which were brought from the neighbourhood of Axinon by Lord Nugent, and which, as I am informed by my friend Mr. Ogilby, who examined them attentively during a visit to their noble owner, differ in no respect from the common fallow-deer of our parks. Moreover, as remarked by the same gentleman, the universal application of the word *dama* to this animal, in the Italian, French, Spanish, and other modern languages derived from the ancient Latin (added to the fact of the animal being still found in the forests of Italy, where there are no parks or enclosures), points it out as the beast of chase so frequently mentioned under the same name by the Roman poets. Mr. Ogilby likewise remarks, that it is, in all probability, the *Platycerus* of Pliny, or rather of the Greeks, from whom he copied. It is said, in a note to the second edition of the *Regne Animal*, to have been found in the woods of Northern Africa.

In the communication from Mr. G. Jackson, Glengariff, referred to in treating of the preceding species, he added, "there is an abundance of fallow-deer, which are all at large through the woods and adjacent mountains. They had become so numerous as to do great injury to the farmers, and my time has been taken up shooting the does."

On 10th February, 1838, two friends accompanied me to Shane's Castle-Park (County Antrim), and we were told by the game-keeper that there were then about three hundred head of fallow-deer in it. A bushel of beans was daily given to them, near the same hour, at which time many

* Dr. Ball considers that the accumulation of red-deer remains in Ballinderry, may be accounted for by the animals having fallen through in attempting to pass over the ice when the lake was frozen.

of them congregated around the place where they were fed. We accompanied the keeper to see them feeding, and, whilst walking along, he hallooed as the huntsman does to his hounds. The deer came tripping from every quarter, and it was extremely beautiful to see them come filing along. On looking in the direction from which most of them came, and seeing such a multitude, I was reminded of Halliday's description (in the United Service Journal) of some of the herds of antelopes in South Africa.

The keeper threw the beans about, as if sowing broad-cast, and the deer followed us—the nearest being from twenty to twenty-five yards distant. The old males occasionally butted at each other, and attracted our attention by the rattling of their horns one against the other. The severe cold of that season (1838) had not been fatal to any of the deer; but during the previous winter, which was very wet, great numbers died.

When on a visit at Florence Court, in October, 1840, I learned that many of the deer died there, in the course of the last wet winter, although they had plenty of food.

The destruction of a wounded fallow-deer, by his companions, in the deer-park, near Belfast, is referred to in a foot note on page 277 of the 3rd volume of the present work. Vide "Birds of Ireland."

Some observations on the red-deer and fallow-deer will be found in Dr. Scouler's paper, from which I have given an extract in reference to the marten.

THE ROE-DEER, *Cervus Capreolus*, Linn.

I have not been able to learn that this species ever inhabited Ireland; nor have I known of its horns having been disinterred from our bogs.

EXTINCT ANIMALS

OF THE

CLASS MAMMALIA.

(Terrestria.)

THE BEAR, *Ursus Arctos*, Linn.

I AM not aware of any written evidence tending to show that the bear was ever indigenous to Ireland, but a tradition exists of its having been so. It is associated with the wolf as a native animal in the stories handed down through several generations to the present time.

[See observations by Dr. R. Ball, in reference to the skulls of bears found in Ireland. Trans. R. I. Academy, 10th Dec., 1849.—Ed.]

THE WOLF, *Canis Lupus*, Linn.

As Dr. Scouler has brought together the *facts* bearing on the wolf (Journal Geol. Soc. Dub. vol. i. p. 225), I shall use his words:—"Great numbers of wolves formerly existed in Ireland, and they maintained their

ground in this country for a longer period than in any other part of the empire. Campion, whose History of Ireland was published in 1570, informs us that wolves were objects of the chase. 'They' (the Irish) 'are not,' he says, 'without wolves or greyhounds to hunt them; bigger of bone and limme than a colt.' A century later they appear to have been equally abundant, for we find by the journals of the House of Commons that in 1662 Sir John Ponsonby reported from the Committee of Grievances, that a bill should be brought in to encourage the killing of wolves and foxes. Effective measures for this purpose appear to have been taken, and the wolf was at last extirpated about the year 1710. Dr. Smith, in his History of Kerry, when speaking of certain ancient enclosures, observes that 'many of them were made to secure cattle from wolves, which animals were not finally extirpated till the year 1710, as I find by presentments for raising money for destroying them in some old grand-jury books.'"

Three places in Ireland are commemorated, each as having had the last Irish wolf killed there, viz. one in the south; another near Glenarm; and the third (Wolfhill) three miles from Belfast.

That noble race of domestic animals the Irish wolf-dog, so successfully used in the pursuit of wolves, has, since no longer required, been neglected, and must now, I fear, be called extinct. In reference to this animal, Dr. Scouler gives the following notice (p. 266):—

"The wolf-dog must now be included in the list of lost animals, although the date of its disappearance is within the memory of people still living. This race appears to have been unknown to the Romans, although that people appear to have put a high value on British dogs. Oppian, who has given a good description of the Scotch terrier, does not notice the Irish wolf-dog. Perhaps the Irish wolf-dog is alluded to by Symmachus, a writer of the 4th century, who informs us that seven Irish hounds (Septem Scotii Canes) were exhibited in the circus at Rome, where they excited admiration on account of their strength and fierceness. The Irish wolf-dog was a very distinct race from the Scotch hound or wolf-dog, which resembled the Irish breed in size and courage, but differed from it by having a sharper muzzle and pendent ears."

[Notes from Scrope's Art of Deerstalking.]

Irish Wolf-dog, Irish Greyhound, Highland Deerhound, and Scotch Greyhound are the same.—p. 334. See also pp. 341, 342, for proof of Irish wolf-dog and Irish greyhound being the same.

"It appears from Symmachus that in the fourth century a number of dogs, of a great size, were sent in iron cages from Ireland to Rome. * * It is not improbable that the dogs so sent were greyhounds, particularly as we learn from the authority of Evelyn and others that the Irish wolf-dog was used for the fights of the bear-garden" (p. 335).

"Judging also from the drawing of Lord Altamont's dogs given by Mr. Lambert (Linnean Transactions, vol. iii.), and from the measurement taken by him in 1790, it is evident that these wolf-dogs, as they are called, bore no resemblance whatever to the Irish greyhound, as described by Holinshed, with which also they hunted wolves, as is apparent from their broad pendulous ears, hanging lips, hollow backs, heavy bodies, smooth hair, straight hocks, drooping tails, and party colour; but were in all probability a remnant of the old Irish bloodhound, which was frequently used for tracking wolves, and which, at a later period, might have been mistaken for a species then in that country nearly, if not altogether, extinct."

Buffon mentions his having seen an Irish greyhound in France, "which appeared, when sitting, to be about five feet high, and resembled in figure the Danish dog, but greatly exceeded him in stature. He was totally white, and

of a mild and peaceable disposition."—(Quoted by Scrope, p. 342. See also Bell's British Quadrupeds, p. 241.)

[For further information relative to the former abundance of wolves in Ireland, and the means adopted to prevent the export of "wolf-dogges," see O'Flaherty's West or H-Iar Connaught, published by the Irish Archæological Society, and the Editor's notes.—ED.]

THE OX, *Bos Taurus*, Linn.

The remains of a race of oxen, believed to be peculiar to Ireland, are found in our bogs. The distinguishing characters are, "the convexity of the upper part of the forehead, its great proportional length, and the shortness and downward direction of the horns."

[See an abstract of a paper by Dr. R. Ball, "On the remains of Oxen found in the bogs of Ireland," in the Proceedings of the Royal Irish Academy, January 28th, 1839.—ED.]

Dr. Scouler, in his paper already quoted, after referring to several of the extinct animals, adds:—"If we now compare the account of the extinct animals of Ireland with the history of those which have disappeared from Britain, we will find several remarkable deficiencies in the Irish list. No mention has been made of the bear, the beaver, the *wild ox*, or the fallow-deer; and if animals so remarkable from their size and habits have escaped all notice on the part of the older writers, the legitimate conclusion appears to be, that, like the adder and the blind-worm, they were not indigenous to the country. * * Two races of oxen were formerly inhabitants of Britain; the one of great size, whose horns are found in bogs, but of whose existence we have no traditionary evidence. These horns have attracted attention for a long time, and a very good figure of them is given by Gesner, who obtained his specimen from England. It is remarkable that no indication of the former existence of this race of oxen in Ireland has yet occurred, nor could I obtain any evidence that they have ever been found in the bogs of this country."

The second and smaller race is still pastured in England, and was abundant in the Scotch forests at no very remote period, but, like the greater race, we have yet no evidence that it ever was a native of this country.

THE ELK, *Cervus Alces*, Linn.

A horn of the true elk (*C. Alces*), as noticed by me in the "Proceedings of the Zoological Society of London" for 1837, p. 53, was some years since presented to the Natural History Society of Belfast. It was given to the donor by a relative residing at Stewartstown (County Tyrone), who attached much value to it as a singular relic dug out of a peat-bog on his own property in that neighbourhood. That it was so obtained I am assured there cannot be a doubt. The horn is that of a very old animal, and quite perfect. On removing the paint with which it was besmeared, the horn certainly presented a fresh appearance; but might not this be attributed to the well-known preservative property of the soil in which it is said to have been found? There is not, that I am aware of, any record of this animal having ever existed in a wild state in the British Isles; but as it inhabited a wide range of latitude on the continent of Europe, it is within the bounds of probability to believe that it may have been a native species.

THE WILD BOAR, *Sus Scrofa*, Linn.

This animal was at one period common in Ireland, but has long since become extinct.

In reference to this species, Dr. Scouler remarks (p. 226):—

"The wild boar was formerly the most abundant of the wild animals of Ireland. According to Giraldus Cambrensis, they occurred in vast numbers, but they were a small, deformed, and cowardly race. They continued to be plentiful down to the 17th century. I have not been able to ascertain the date of their extinction."

Tusks of this species dug up in our bogs are often of goodly dimensions.

THE GIGANTIC IRISH DEER OR FOSSIL ELK.

Cervus Megaceros.
— *Hibernicus, Desm.*
Megaceros — *Owen.*

We have not discovered amongst Mr. Thompson's MSS. any notes respecting this extinct animal; but the reader will find full information on the subject in Professor Owen's "History of British Fossil Mammalia and Birds," and the several works there quoted.

"Remarks on the Natural History of the Fossil Elk," by Dr. Scouler, appeared in the Journ. of the Geol. Society of Dublin, vol. i. p. 197, with references to other authorities.

Professor Owen's work likewise contains a notice of the discovery of fossil teeth of a species of Horse in Ireland.—ED.]

SECTION II.—MAMMALIA AQUATICA.

THE COMMON SEAL, *Phoca vitulina*, Linn.,

Is frequent in suitable localities around the coast. Dr. Ball, in a paper "on the species of seals inhabiting the Irish seas," published in the Royal Irish Academy's Transactions for 1838, gives interesting information on this species. The following is an extract:—

"On the 30th of September last I received from my friend Mr. Yates a living specimen, taken two days before at Lissadell, County Sligo. It appeared in perfect health, was about three feet eight inches in length, and its short muzzle, high forehead, and large eyes, strongly distinguish it from Halichœrus. When wet, it is almost black, variegated with whitish slate colour, and is somewhat lighter on the breast than on the other parts: when dry, it is of a light, pearly, grey colour. It had, when I received it, a portion of long fawn-coloured hair on its flanks, evidently the remains of a more general coat, but this fell off in a few days. On turning this seal out on the grass at the Zoological Gardens it advanced fearlessly on the person nearest to it, and was not to be turned aside, though pretty smartly struck with a heavy cloth. Its mode of battle is, when within a proper distance, to turn on its side, and scratch with its uppermost fore-paw, which it is able to extend considerably, and use with great power and

rapidity. It seldom attempts to bite; and I have not observed it snarl in the unpleasant manner uniformly practised by all the Halichœri I have seen in captivity. It has a singular and effective mode of progression, accomplished by convulsive starting jumps as it lies on its side, with its fore-paws on its breast, and its hind ones closely pressed together. Its ordinary motion, a sort of gallop, is tolerably rapid, and the power of continuing it is considerable, as was evidenced by its having passed over rough ground, to a distance of at least a mile and a half, on escaping one night from the place in which it was confined. This animal refused food for twenty-two days after its original capture, but has since fed freely on whiting * (Gadus Merlangus), which is swallowed whole, the head merely being first a little bruised. It knows the keeper, and can distinguish at a distance whether he has fish with him or not. Its attention seems always alive to passing objects, and when a bird alights in its cage the attempt to capture it is quite laughable: the seal commences by fixing its eyes on it with all the apparent earnestness of a pointer dog, then makes a plunge head foremost, and, on the bird escaping, exhibits very evidently its disappointment. A specimen similar to that just described was killed with small shot in the river Liffey, not far from the Custom-house, by one of the Coast Guard Service, on the 23rd of October last. In its stomach were some half-digested fish, which appeared to be the sand-launce (*Ammodytes Lancea*). I have been informed that seals are not unfrequent in this river, whither they are supposed to follow herrings."

Seals have been becoming gradually more scarce of late years in Belfast Bay, where a portion of the coast on which doubtless they were once numerous bears the name of Craig-a-vad,—i. e. the Seal's Rock.

In parts of the neighbouring Strangford Lough and also at Carlingford they are still abundant.

The Rev. George M. Black, in a letter which I received from him, dated 24th October, '49, says;—"I am sometimes interested and amused, when occasionally sailing along the coast in summer in a small pleasure boat, by a seal noiselessly putting its head out of the water, perhaps within ten yards of me, and looking at me with its glazy eyes—then as suddenly disappearing. A small island at the entrance of Carlingford Lough is a favourite haunt of theirs. They are frequently fired at, but unless '*killed dead*,' as we say in Ireland, are seldom got, as they are rarely many yards from the water, which they make their way into as quickly as possible."

When visiting the neighbourhood of Carlingford on 9th Sept. 1836, I was informed that the abundance of seals there was owing chiefly to a prejudice amongst the fishermen that it is *unlucky* to kill them. One of this craft who rowed our party across the bay stated, that a man once killed a seal which was entangled in his herring-net, and that he never caught so much as "a maze" of herrings afterwards! (See Edmonston's remarks in Wernerian Memoirs, vol. viii. part 1.)

In June, 1832, during a visit to Horn Head (County Donegal), I was told that seals are killed there by night with the aid of torch-light. They are found in dry caves and despatched with clubs. Many years ago —perhaps forty, prior to the last-mentioned date—the servants of Mr. Stewart of the Horn are said to have killed forty in this manner on one night. At all events the number was so great that a song was composed in commemoration of the fate of the seals. The gamekeeper informed me that he had known four men to kill twenty-four seals here, within two hours, in the caves at low water.

This mode of killing seals is similar to that adopted on the coast of

* It is allowed 6 lbs. of fish *per diem*, but would eat much more.

Caithness at the time of Pennant, and circumstantially described by him in his British Zoology, vol. i. p. 124.

In Maxwell's "Wild Sports of the West," Letter 7, a story is told of a seal which had been taken when young in Clew Bay, and domesticated in the kitchen of a gentleman whose house was situated on the sea-shore. There it remained for four years, and so great was its attachment to this habitation that it returned three times after having been as frequently committed to the deep, at a considerable distance from the shore, with the view of banishing it. On the last of these occasions it had been cruelly deprived of sight, but, notwithstanding this, the poor animal contrived to find its way back on the eighth night after its expulsion. The same writer adds the following note:—In January, 1819, in the neighbourhood of Burnt Island, a gentleman completely succeeded in taming a seal. Its singularities attracted the curiosity of strangers daily. It appeared to possess all the sagacity of the dog, and lived in its master's house and ate from his hand. In his fishing excursions this gentleman generally took it with him; upon which occasions it afforded no small entertainment. When thrown into the water it would follow for miles the track of the boat, and although thrust back by the oars, it never relinquished its purpose; indeed, it struggled so hard to regain its seat that one would imagine its fondness for its master had entirely overcome the natural predilection for its native element.

At Ballantrae (Ayrshire), on 29th August, 1839, I purchased a seal of this species which had been just captured in the salmon nets;—a very rare occurrence. One of the fishermen, who had formerly served in a Greenland whaler, stated that in the north he had seen three hundred seals killed in one day, and that they distinguished five kinds by colour. The young ones they had taken alive, and had kept for a few days on board, but it had been always found necessary to despatch them, in consequence of their noise at night preventing the sailors from sleeping.

Some interesting notes relative to seals upon the western coast of Ireland in the seventeenth century will be found in O'Flaherty's West or H-Iar Connaught.—Rutty also mentions the seal.

The Grey Seal, *Halichœrus Gryphus*, Ball,

Has been found around the coast generally.

We are indebted to Dr. Ball for distinguishing this species as a native of the British seas. Mr. Bell, in his History of British Quadrupeds, p. 279, *et seq.*, gives full and valuable notes respecting this animal, supplied to him by Dr. Ball, and the latter gentleman has given further information on the same subject in his paper already referred to in connexion with the common seal. From this paper I extract the following note contributed by myself.

"January 31st, 1837.

"George Matthews, Esq. of Springvale, in the county of Down, informed me to-day that about three weeks ago, when setting out to shoot wild-fowl near Ballywalter, accompanied by an attendant, they observed an old and young seal upon the rocks, at such a distance from the sea as induced them to commence pursuit in the hope of intercepting them on their return to it. In this they were so far successful as to capture the young one, which they fastened to the rock, hoping that its cries, which they compared to those of a calf, might attract the parent within gun-shot. They then concealed themselves to the windward of the old one, and for about an hour and a half saw it emerge at the distance of from four to five hundred yards at least once every ten or fifteen minutes, but oc-

casionally much more frequently. Seeing that it came no closer to the land, they changed their position to leeward, which they had no sooner done than its nearer approach was apparent; and when from one hundred and fifty to two hundred yards from the shore, my friend fired at it with a musket charged with a single ball, which, after passing through its head, was remarked to strike the water forcibly about forty yards further on. Life was not quite extinct when it was rowed up to. When brought ashore milk was extracted from its mammæ. This animal was of a uniform whitish grey colour, with darker spots; it weighed 3 cwt. and 18 lbs., but when in good condition would probably have been 4 cwt. On skinning it two pellets were taken from near the hinder extremity, and a grain of large shot from the head; it had frequently been fired at before, and from superiority of size had for many years been a well-known character on the coast, and was distinguished by the name of *Old Skull*, in consequence of its favourite resort being a rock called Skull-Martin. The young one was at least three feet in length, and was estimated to weigh 60 lbs. It was of a canary colour on the back; the remainder paler, without spot or mark, except the muzzle, which was black; its hair was long and silky.

"Major Mathews states that many years since he has seen from two to three hundred seals together on the rocks near Springvale, where they are now scarce, not from having been destroyed, but from the neighbourhood having become so much more populous that the rocks they frequented are daily traversed by persons collecting the edible seaweeds (*Rhodomenia palmata*, *Porphyria vulgaris*), and limpets (*Patella vulgaris*). They are still very numerous in the rocks a little further southward, where, in the perhaps somewhat exaggerated language of the country, they are said to be seen 'in droves like sheep.' Major Mathews remarks, that when he has fired at seals looking towards him they always dived from the flash of the gun, and that he was only successful in shooting them when their eyes were turned from him.

"From the description both of the young and adult animals above noticed, I had little doubt that they were your Halichœrus griseus or Gryphus; and as their carcases still lay on the beach where they were skinned at Springvale, about twenty miles distant, I had them brought to Belfast, when, by the aid of your lithographed drawings, my supposition respecting their species was confirmed by actual inspection. I presented them to our Natural History Society [Belfast], in whose Museum the skeletons of both are now in part preserved. Here is also a specimen of the Phoca vitulina, which was shot December 28th, 1831, in the river Lagan, at some distance above the Long Bridge at Belfast; the tide, however, flows beyond the place where it was killed. Some years before, a seal was obtained in the same locality, and in a deep pool beneath one of the arches of the bridge just mentioned. Our friend Mr. G. C. Hyndman on one occasion saw two young seals, most probably of the common species."

Mr. St. John has devoted the 29th chapter of his "Wild Sports and Natural History of the Highlands" to an excellent account of seals and seal-hunting. His observations relative to individual seals being distinguished from each other reminded me of "Old Skull" of Skull-Martin. He says:—"An old seal has been known to frequent a particular range of stake-nets for many years, escaping all attacks against him, and becoming both so cunning and so impudent that he will actually take the salmon out of the nets (every turn of which he becomes thoroughly intimate with) before the face of the fishermen, and retiring with his ill-gotten booty adds insult to injury by coolly devouring it on some adjoining point of rock or shoal, taking good care, however, to keep out of reach of rifle-ball or slug." And again:—"Scarcely any two seals are exactly of the same colour or marked quite alike, and seals frequenting a particular part of the coast become easily known and distinguished from each other."

In October, 1844, during a visit at Twizell House, I was informed by

Mr. Selby that the common seal (*Phoca vitulina*) is now scarce at the Fern Islands,—the grey seal (*Halichœrus Gryphus*) being the species most numerous there. The latter animal is that which he formerly considered the *Phoca barbata*. He stated that they prey on female Lump-Suckers, rejecting the skins, and that the surface of the water exhibits the oil which has escaped from the fish. (See Richardson's Faun. Bor. Amer. on this subject.)

Mr. George Ransom of Ipswich informed me by letter dated 3rd December, 1851, that a specimen of the grey seal weighing 770 lbs. was lately captured on the Fern Islands off the Northumberland coast by Mr. Robert Pattison of Bedford, and is the largest he ever saw. It was sent to the Ipswich Museum. One sent thence to the British Museum weighed 742 lbs.

On 30th April, 1851, Mr. Robert Warren, jun., mentioned his having lately shot a young seal on the coast of Mayo. It measured four feet from the nose to the extremities of the hinder feet, and weighed 70 lbs. The blubber was about an inch thick, and when melted produced nine bottles of oil,—six of them as clear as any that could be bought. He added:—"Seals are pretty numerous about the bay [Killala], and at low water they frequent a sand-bank opposite to Killala. On a fine day from twenty to thirty may be seen on it basking in the sun. They always keep close to the water, and on the least alarm scramble into it with astonishing speed. They are of various shades of colour; black, grey, reddish-brown, and fawn. A few days ago I saw two of a beautiful light fawn colour approaching white." Mr. Robert Taylor, who visited the same locality in May, 1851, supplied me with the following note:—"On the 22nd I saw twenty-three together on the coast about Bartra Island, Killala Bay, and going from the Island to Kilcummin Head on the 24th we saw upwards of a dozen. They are very wary, and it is almost impossible to get a shot at them. Some are very large, fully twice the size of the last shot one, which weighed one hundredweight three quarters and twenty-one pounds."

In Dr. Ball's paper already quoted he expressed his opinion, that in addition to the two species of seal which I have noticed there is at least one other on the coasts of Ireland, but he had not been able to obtain specimens.

Dr. Ball informs us that from the circumstance of a specimen of the *Phoca cristata* having been captured in the Orwell River at Ipswich in 1847, as noticed by Dr. W. B. Clarke of Ipswich in the Annals of Natural History, he is of opinion that the Irish seals above referred to were of that species, and that the seal seen by Captain M'Ilree, and to which he referred in his paper above alluded to, was clearly of that species.

CETACEA.

The Common Dolphin, *Delphinus Delphis*, Linn.,

Is found on the coast from north to south of at least the more easterly half of the island.—I have not heard of its occurrence on the western coast. Templeton notices it as common, alluding, it may be presumed, to the north-east coast:—heads of this species, without labels indicating localities attached to them, are in the Belfast Museum, some of which are

probably from this quarter. The dolphin seems to be of rare occurrence on the Dublin coast, as Dr. Jacob informed me in January, 1839, that in the course of many years he could obtain but one specimen. Dr. R. Ball considers it as not uncommon on the southern coast, and it is named in the Cork Fauna of Dr. Harvey.

The following notes were made by me on the Mediterranean when on board H. M. S. Beacon in 1841 :—

April 16th. A herd of dolphins, in size and colour like the common species, kept rolling about near our vessel in the Straits of Messina.

May 4th. Egean Sea. A round-backed species of *Delphinus* with a large dorsal fin, to which the sailors gave the name of Porpoise, rolling near the ship; three passed with amazing velocity, close under the bow where I was standing.

May 5th. Several of them near the ship when we were close to Syra; two rolling about with their young so near to them that the dorsal fins of the two individuals in each case appeared to belong to one animal :—they thus exhibited themselves rising to the surface and going down again several times with as much regularity as a pair of horses in harness. May not their appearance in this manner have given rise to the fable of their drawing the chariot of Amphitrite across the sea?

May 13th. Dardanelles; saw the same species at Koum Kali.

May 17th. Bosphorus; several of the same, going northwards towards the Black Sea. This *Delphinus* was not either of Risso's—*D. globiceps*, or *D. Risso*. Cuv. *Hist. Nat. L. Eur. Merid.* tome iii. p. 23, pl. 1, f. 1, 2.

It is worthy of remark that no species of *Delphinus* (Linn.) appeared in the open sea between Marseilles and Malta or thence to the Levant.

THE BOTTLE-NOSED DOLPHIN, *Delphinus Tursio*, Fabr.,

Can only be noticed positively as having twice occurred.

Dr. J. E. Gray, in a paper on British Cetacea, published in the Annals of Nat. Hist. for February, 1846 (vol xvii. p. 84), mentioned having in his possession a drawing of one made by Mr. R. Templeton from a specimen caught on the south coast of Ireland; and on 15th Sept., 1851, Dr. R. Ball wrote to me as follows :—"I got a fine specimen of *Delphinus Tursio* taken here [Dublin] about the 5th inst.,—the only one I ever saw. I have made a cast of it."*

In M'Skimmin's History of Carrickfergus it is observed, under the title *Balæna* :—"A very large fish is sometimes seen by the fishers, which they call a Bottlenose."—It is uncertain, however, what species this may be.

Only three individuals of the *D. Tursio* are noticed in Bell's British Mammalia (1837) as having occurred on the coast of Great Britain,—one of these was taken on the coast near *Berkeley* (Hunter), another in the river Dort (Montagu), and the third in the river at Preston (Jenyns) :—a few years before 1835, when the Manual of British Vertebrate Animals was published, a fourth individual is mentioned in the latter work as taken in the Thames.—The following paragraph from the Preston Pilot was copied into the Northern Whig of Sept. 26th, 1840.

"A DOLPHIN. The inhabitants living in the vicinity of the old quay, at Lancaster, were thrown into an unwonted state of activity and excitement early on Sunday last by the vagaries of a large sea-monster, which was jumping about, and spouting out jets of water, in the river Lune, a little below the old bridge. As soon as it got sufficiently light, all who could lay their hands on a gun were

* Three others have since occurred. R. Ball, June, 1852.

firing away as fast as they could get re-loaded, and the owners of boats, armed with harpoons, lances, and scythes, were lying in wait for him in all directions to give him a warm reception, as soon as he should show himself above water. After about three hours' hunting, he was shot in the head by a marksman posted at the old bridge, when he immediately spouted an immense jet of blood, and a man, being near at the same time in a boat, struck him with a harpoon, and after some little further trouble he was landed, and proved to be a large specimen of the *Delphinus Tursio*, measuring about twelve feet and a half in length, and weighing fifteen hundredweight,—a fish whose appearance in our latitude is a very rare occurrence; indeed there are only some four or five instances on record of this fish having been seen in England, two of which have been taken near Lancaster, the one under notice, and another some years ago in Morecambe Bay."

THE PORPOISE, *Phocæna communis*, Lesson, *Delphinus Phocæna*, Linn.,

Appears to be common around the coast.

It is so on the northern and north-east coast. Rutty noted it in 1772 as frequent on the Dublin coast, whence Dr. Jacob has often procured specimens. In Smith's History of Cork the following appears:—

* "Phocæna, *Rondeletii de Piscib.* i. 473; *Johnston de Piscib.* 155; *Raij Synop. Piscib.* 13; and *D. Tyson*,—The Porpoise. This is in all the havens about the coast. There is a good figure of it in Willoughby's History of Fishes, Tab. A. fig. 2.* Great numbers of them were a few years ago left on the strand of Ballycotton. They pursue smaller fish and devour them. I have seen an army of porpoises, as it were, guarding the mouth of Youghall harbour, where they made great havoc among shoals of salmon which were then entering the Blackwater River, and even chased some on shore."

Dr. Ball considers it as rather common on the southern coast.

Mr. John Nimmo informed me, in 1837, of its being common in the summer months at Roundstone, Connemara. Summer is named by writers† as the season of its occurrence on our northern coasts, and at this period it has come under my own notice. When crossing to the Copeland Islands, off the coast of Down, in three different years, in the month of June, porpoises were seen, and sometimes within thirty yards of our boat. These remarks are made in consequence of Mr. Bell's observation respecting Great Britain, namely, that "it certainly frequents our coasts, more particularly late in the autumn and in the spring." *Brit. Quad.* p. 474. Porpoises have of late years been seen so far up Belfast Bay as Conswater Beach, within half a mile of the town.

I have seen the remains of the porpoise on the beach at Ballantrae, Ayrshire, and have the following note in my journal in reference to that locality:—

"March 16th, 1846.—Mr. Sinclaire, who came from Ballintrae to-day, informs me that about thirty porpoises from three to six feet in length have, during the great take of herrings there within the last two or three weeks, been taken in the nets; he saw their bodies on the beach."

In Harris' History of the County Down, published in 1744, it is remarked at page 242:—

"There has been no considerable fishery for herrings in this bay [Carrickfergus] since the fleets were there at the Revolution. Yet they are often forced in by shoals of porpoises, of which, about twenty-three or twenty-four years ago, more than forty came up into it, and were pursued into shallow water by a

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* A good figure of the Porpoise. W. T.

† M'Skimmin's Carrickfergus; I. D. Marshall's Rathlin.

ship's crew, who fired at them till they lodged them in the Ouze about Whitehouse, when, the tide retiring, they were all taken, and yielded great quantities of oil. A suit was commenced by the Earl of Donegal for the royalty of these large fish against the captors; which at length, after great expense, was carried in favour of the royalty."

A fisherman at Newcastle (County Down) informed me in October, 1851, that porpoises are numerous on that part of the coast, and are frequently taken in the herring-nets. He had seen young ones of not more than ten pounds' weight following the parent.

THE GRAMPUS, *Phocæna Orca*, F. Cuv., *Delphinus Orca*, Fabr.,

Visits the coast.

Templeton states that it "appears on the coast of Ireland along with the herring:" Dr. J. D. Marshall, that it is "met with in great numbers [about Rathlin] during summer, and is said to be very mischievous, and not unfrequently to endanger boats,—an observation indicating that the true grampus is alluded to. In M'Skimmin's History of Carrickfergus it is said to be "an occasional visitor during summer;" and "a very large fish called the herring-hog, seen in pursuit of others, especially of the herring, with a larger dorsal fin," and hence imagined by this writer to be the fin-backed whale, is probably the grampus: he mentions one as cast ashore at Kilroot. In M'Skimmin's first edition, 1811, he notes the "herring-hog, said to be a very large fish, often upwards of twenty feet long," p. 184.

The Cetacea mentioned in Sampson's History of Londonderry as visiting that coast are the porpoise and the grampus.

I am enabled to state that this species occurs on the north-east coast, from the examination of a cranium which came under my notice in 1839, when it was presented by Dr. Drummond to the Belfast Museum. The animal had been taken at Donaghadee ten or twelve years before that time. This cranium is thirty-two inches and a half in extreme length, and sixteen inches and a quarter in height; it perfectly agrees with that represented in Cuvier's Oss. Foss. pl. 223, f. 3; edit. 1834.

In Rutty's Dublin it is remarked under *Grampus*, "that forty-six were said to have been cast upon our coast in March, 1716;" but these were more probably *Delp. melas*. The grampus is included in the Fauna of Cork. The following paragraphs appeared in the Cork Reporter, and were copied into the Northern Whig, a Belfast newspaper, at the dates mentioned.

"SHOAL OF GRAMPUSES.—About ten o'clock on Sunday a shoal of grampuses, about sixty in number, entered our harbour, and continued their course until they reached Horsehead, where they turned. They were chased by all the boats in the harbour, and several shots were fired at them. The scene was indeed extraordinary; the strange visitors rolled and tumbled about, and spouted up the water to a considerable height. The tide was on the ebb, and the young monsters, finding themselves hotly pursued, made for the harbour, which they passed at about twelve o'clock. Several were taken, one of them weighing over three tons." *N. Whig*, July 31, 1841.

"SHOAL OF WHALES.—Bantry Bay has been the scene of great excitement, high enjoyment, and most valuable occupation to the people of this locality, this week, in consequence of a very large shoal of whales—grampus species—which entered that harbour on Monday, and found their way to the romantic bay of Glengariff on Tuesday—the evening of which day found all kinds of boats, weapons, and missiles in requisition for the attack on the herd. An immense number were secured,—a correspondent states three hundred, the value of

which he computes at £1500. Nothing could exceed the spirit-stirring character of the whole scene, enhanced as it was by the beautiful weather, and splendid scenery of the bay." *N. Whig*, May 21, 1844.

The latter at least must, I consider, apply to the *D. melas*.

Since the preceding was written I find that a cranium of *D. melas* (twenty-three inches and a quarter in length and thirteen inches in height) in the Belfast Museum was presented as that of a "grampus, one of a number cast ashore at Youghal," thus showing that this name is sometimes applied in the south to the other species.—A herd of not less than a hundred grampuses mentioned to me by Mr. John Nimmo, in 1837, as having been once seen by him in Roundstone Bay, Connemara, were probably the allied species, and of whose occurrence on the western coast we have had ocular demonstration.

On 4th or 5th February, 1848, two individuals of some kind of Cetaceous animals entered the bay of Belfast and came near the quays of that town, above Mr. Thompson's embankment. They were first observed at "grey dawn" by men engaged in removing the beacon lights, some way below Connswater, and who rowed up towards the animals, mistaking them for a yawl adrift. On a near approach, however, they were not a little surprised by the spouting up of a large jet of water which would have half filled their boat, and by the disappearance of the object of their curiosity. After a little time the latter again came to the surface, and, several boats having arrived, a general pursuit ensued, in the course of which a number of shots were fired, but apparently without effect. One boat, in which were several men from the guard ships and armed with boat-hooks, was rowed between the two Cetaceans, who had become partially aground and were so close together that there was scarcely room for the boat to pass. The boat-hooks and oars were freely used in stabbing the poor animals and tearing off pieces of their blubber, which caused them to "grunt like pigs," as the narrator expressed it, but the flowing tide soon enabled them to retreat into deeper water, and the assailants, finding them afloat, were glad to escape as speedily as possible. The boat which passed between them was twenty-four feet long, and the animals were described as being at least thirty feet in length, both as they extended beyond the boat astern and stern. They had one back-fin each about two feet and a half high, and thought to be nearer to the head than to the tail. The head was considered to resemble in form that of the porpoise, according to the figure in Bell's British Quadrupeds which was shown to the parties, and the eyes were full and large.

Another informant stated that when he saw the animals he thought they were a "lighter sinking."

The captain of a small tug-steamer plying in the bay gave chase for upwards of a mile, and was able to pass the animals by putting on "full steam," but he abandoned the pursuit, as he could not follow into shallow water so as to make the prize his own. The noise of the paddles and of blowing off the steam appeared to occasion great alarm. On the following morning the same captain observed the "whales at Holywood bank, and renewed the chase as far as Cultra, in the direction of the open sea. The engineer of this steamer corroborated the captain's statements, and they also concurred in saying that at first they thought there were two animals, but on a close approach they considered that there was only one, as the two bodies appeared to be joined at the inner sides, so far as visible. The two together were as broad as the deck of the steamer—about fourteen feet—and they rose simultaneously in the water, their backs suggest-

ing the idea of "a double-roofed house." They inclined to float lazily on the surface when not disturbed; and when they disappeared underneath it was only for a short time. Water was blown from the front of the head when the latter was above the sea, and in a forward direction along the surface—not upwards.

All parties who saw the animals agreed that they were neither *bottle-nosed* whales nor dolphins; and I have no doubt, everything considered, that they were grampuses.

When at Newcastle (County Down) in October, 1851, I was informed by fishermen that the grampus is seen there every summer, and is called the "Herring Hog." They identified the species on my showing them the figures in Bell's British Quadrupeds.

THE CA'ING WHALE, *Phocæna melas*, Bell, *Delphinus melas*, Traill.,

Is of not very unfrequent occurrence on the ocean-coasts of Ireland.

I am not aware of their having visited the eastern line of coast, the favoured one of the *Hyperoodon*. Some years since, in the Annals of Natural History (vol. v.), I noticed the *D. melas* as follows:—

"This species is stated by Dr. Ball of Dublin to be occasionally driven ashore in large herds on the southern coast of Ireland, and to be of frequent occurrence in the month of June at Youghal. Here a herd of seventy-five came ashore a few years ago, of which the average size was from 11 to 18 feet, but one individual had attained to 22 feet in length. When visiting the South Islands of Arran (off the coast of Clare), in June, 1834, accompanied by Dr. Ball, a portion of a skeleton of a *D. melas* was found by us on the beach. On this gentleman revisiting the same islands in the following summer, he saw the remains of a herd of these animals lying where they had perished: the inhabitants speak of them as common."

Since the preceding appeared, the following newspaper paragraphs have come under my notice.

"THE CA'ING WHALE.—A shoal of the above came into the bay at Ardmore on Friday, and many were captured by the poor people in the neighbourhood."—Copied from the *Cork Standard* into the *Northern Whig*, July 4th, 1840.

"CAPTURE OF WHALES.—On Sunday morning an immense shoal of large fish was observed by Mr. William Murphy and others of Carracloe, disporting off that coast. After the lapse of some time, two boats manned by willing and athletic hands pushed out in pursuit, armed with guns, &c. The second shot having taken effect on one of those novel visitors to our shore, it immediately uttered a fearful cry and rushed towards the Wexford bar, followed by all its comrades. The pursuers continued firing and making much noise, and finally succeeded in driving them on shore near the Raven Point, where they made thirty-eight captives. They proved to be that description of the whale tribe known by the name of the "bottle-nose," and vary in length from ten to twenty-eight feet, and in weight from five cwt. to four tons. The captors are busily engaged in saving the blubber and other unctuous parts, for the purpose of extracting the oil, which promises to be abundant."—Copied from the *Wexford Independent* into the *Belfast Commercial Chronicle*, July 8th, 1840.

"EXTENSIVE CAPTURE OF WHALES IN LOUGH SWILLY.—On Wednesday morning last a large shoal of whales of the bottle-nosed species were observed making their way into Lough Swilly,—probably in pursuit of herrings. The fishermen of the island of Inch, Rathmullen, and the adjacent coasts immediately mustered in force, and succeeded in embaying the gigantic fish till the tide receded, and left them struggling on the sand, where, in a short time, no fewer than seventy-three were despatched, one of which weighs four tons and a half."—Copied from the *Northern Whig*, July 24th, 1840.

Although the term "bottle-nosed" is applied to the species in the last two paragraphs, the circumstances of these whales visiting the coast in the height of summer in large herds, and attaining the size described, induce me to consider them the species under consideration rather than either the bottle-nosed whale (*Hyperoodon*) or bottle-nosed dolphin (*Delph. Tursio*). Not more than two of the former are known to have appeared together, at least in the British seas; and the latter has come singly and that very rarely, nor is it known to attain more than about half the size of some of the individuals which were captured. Some of the notices under *Grampus* also more probably apply to *D. melas*.

At a meeting of the Belfast Natural History and Philosophical Society, held on 29th October, 1851, Professor Dickie, of Queen's College, Belfast, read a paper entitled "Notes of the Capture of Whales at Dunfanaghy [County Donegal], in July, 1851," of which the following is an abstract:—

"On the afternoon of July 20, 1851, a number of small whales were seen entering the bay of Dunfanaghy. Boats were manned, and means employed to drive them up the estuary. They were eventually stranded in a small bay, about a quarter of a mile above the town, close by the bridge. The unfortunate animals were there assailed by a large number of the people, armed with muskets, axes, &c. They were soon slaughtered, and no fewer than sixty-nine carcases remained to reward the captors for the labour of the day. A week after this occurrence the lecturer visited the scene of capture, but could find only a few fragments of jaws, the carcases, after flensing, having been cut up, and either buried or drifted out to sea. The largest individuals were described as having been twenty to twenty-five feet in length; there were both males and females, the exact numbers of each could not be ascertained. The females were with young, and the mammæ full of milk. Four of the sixty-nine were described as much smaller than the others, of a different colour, and having long, slender snouts, the jaws with numerous small teeth. Of these four he (Dr. Dickie) was unable to procure any relics. There could be no doubt that the larger individuals were examples of *Delphinus melas;* this opinion was confirmed on examination of a skull. The habits of the animals might alone have led to the same conclusion. The four smaller individuals were, most likely, examples of the common dolphin, there being no other British species to which they could be referred; their size, shape, colour, and form of the head, &c., appear to confirm this idea."

The Ca'ing Whale is the species often taken in such numbers in the northern Scottish Islands. Several interesting descriptions of it have been published and are well known, so that I shall only refer to the last which has become known to me. This appeared in the Edinburgh Philosophical Journal for July, 1844, and was entitled a "Notice of the employment of the flesh of small whales for feeding cattle in the Faroe Islands. By W. C. Trevelyan, Esq."

A gentleman who presented jaws and teeth of this species to the Belfast Museum, in December, 1848, stated that in the autumn of that year he had seen one of them, twenty-five feet in length, lying on the north-eastern shore of Scotland, where, he said, these animals are of common occurrence in herds of from twenty to thirty, and that they were there known by the name of "Driver Whales," from the circumstance that when one of them is driven on shore the rest follow.

The Bottle-nosed Whale, *Hyperoodon Butzkopf*, Lacep.

The following notes upon this species were contributed by me to the Annals of Natural History for February, 1840, vol. iv. page 375.

"In Bell's British Quadrupeds, &c., published in 1837, the latest work

treating of our Cetacea, it is observed, with reference to the two individuals of this species recorded by Dale and Hunter, that 'these are the documents upon which alone we have to depend as to the occurrence of the *Hyperoodon* on the British shores.' The works of Jenyns * and Jardine † do not contain any reference to other British specimens. More recently Mr. Thompson of Hull has, in the Magazine of Natural History for 1838 (p. 221), described a whale of this species which was stranded near that town in 1837, and whose skeleton is preserved in the Hull Literary and Philosophical Society.

The first particular record known to me of the occurrence of the *Hyperoodon* in Ireland is contained in the Dublin Philosophical Journal for March, 1825, vol. i., where Dr. Jacob (now Professor of Anatomy and Physiology in the Royal College of Surgeons in Ireland) very fully and ably describes a specimen dissected by him; and at the same time, after a due examination of its anatomy, treats of the place the genus should occupy among the Cetacea. ‡ The individual which formed the subject of the essay "was stranded at Killiney, a few miles from Dublin, in the month of September [1824?]." Its perfect skeleton is preserved in the Museum of the College of Surgeons in Dublin. In Mr. Templeton's Catalogue of Irish Vertebrate Animals,§ the Hyperoodon is mentioned as occasionally met with.

From Dr. Jacob I learned in November last [1839] that within twenty-five years he has known four bottle-nosed whales to be stranded within a short distance of Dublin—of these all, except the one particularly described by him, were taken at Howth, near the entrance of the bay: on one occasion two of them occurred at the same time. [These were seen by Dr. Ball, and he thinks in 1829 or 1830. W. T.]

Early in the month of August, 1836, two *Hyperoodons* were stranded at Dunany Point, near Dundalk. A friend, who saw the specimens when quite recent, described them to me as bottle-nosed whales, and on my sending to him, for the purpose of identification, outlines of the individuals figured by Dale and Hunter, he stated that the form of Dale's figure represented them well. The larger of these animals was 17 feet in length and 14½ in girth; the other was somewhat smaller. Having been stranded on the property of his relative Lady Bellingham, their heads were fortunately reserved for my friend Dr. Bellingham of Dublin. I had lately an opportunity of examining both of these specimens, one of which is in the Museum of the School of Anatomy, Peter Street; the other in that of the Royal Dublin Society. In the latter collection is the head of a second Hyperoodon, which in all probability was one of those already alluded to as obtained at Howth, but I could not ascertain the locality whence it had been received: it is similar in size to the smaller of the Dundalk specimens, and a very few inches less than the larger, the measurements of which are as follow:

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* Manual of British Vertebrate Animals, 1835.

† Naturalist's Library, vol. on Whales, 1837.

‡ The name *Hyperoodon* is objected to by Dr. Jacob as expressing what the animal does not possess—teeth in the palate, this part having been as smooth as the rest of the month in the specimen he dissected. *Ceto-diodon* was proposed by Dr. Jacob as a generic name, and *Hunteri* was applied by him to the species. This elaborate memoir, though published in 1825, is unnoticed in any of the above-cited works.

§ Mag. Nat. Hist. vol. i., New Series.

	ft.	in.
Length from occiput to end of snout	4	6
Breadth of cranium	2	4
Height of ditto	2	0

The crania of the four *Hyperoodons* preserved in Dublin are, I conceive, referrible to one species, and are similar to those represented in Cuvier's "Ossemens Fossiles," pl. 225, f. 19—23, ed. 1834; F. Cuvier's "Histoire Nat. des Cétacés," pl. 9; and Bell's "Brit Quad." &c. p. 496. From what has been already published on the subject any further remarks on these specimens seem to be unnecessary. As supplementary to what appears in Mr. Bell's work, it may be added, with reference to a specific character about which there has been some obscurity, that in the individuals particularly described by Dr. Jacob and Mr. Thompson of Hull two teeth were present in the lower jaw; but in neither instance were they apparent in the recent animal, but were detected only when the gum was cut into in the preparation of the skeleton.

Having heard on the 20th September last [1839] that a whale had been captured at Ballyholme Bay, near Bangor (County Down), on the 16th, I immediately set out for the place, accompanied by a scientific friend, Mr. Hyndman. A small portion only of the animal then remained on the beach, the head, tail, and entire skin, with the blubber, having been removed. This whale was seen on the evening of the 16th September in shallow water not far from the shore, and a boat with the small complement of three "hands" gave chase. Fire-arms were discharged at it, but these apparently not having any effect, its assailants bound a rope to a pick-axe and drove this rude but successful substitute for a harpoon into the animal, and about the same time managed to throw a loop of a rope round its body above the tail, and thus with some little difficulty brought it captive to the shore. Its length was stated to have been 24 feet, the breadth of tail 6, the girth at the thickest part perhaps from 18 to 20 feet; the weight was estimated at about 5 tons. The entire upper surface was of a blackish grey colour, the under parts somewhat paler. The stomach is said to have contained the remains of shells, and what was described to be like the "feet of fowls"—these I have little doubt were portions of the arms or feet of cuttle-fish * (*sepiadæ*). Although it was late in the evening when this whale was brought ashore, its captors at once commenced taking off the blubber, so that unfortunately no person who would have

* Dr. Jacob says of the *Hyperoodon* he dissected, that the oval cavity into which the œsophagus opened "contained a large quantity of the beaks of cuttle-fishes, perhaps two quarts." Again, in the Catalogue of the Museum of the Royal College of Surgeons in Ireland, p. 161, there appears—"Cuttle-fish-bills found in the stomach of a *Balæna rostrata?*" Apprehending that this rather referred to the *Hyperoodon* than the *Balæna*, I wrote to Dr. Jacob respecting it, and learned in reply that the "cuttle-bills" so mentioned were those taken from the former species by him—this is noticed merely to prevent error. In the specimen of *Balæna rostrata* dissected by Dr. Jacob the remains of herrings only were detected. (*Dublin Phil. Journ.* Novr. 1825, p. 343.) The Rev. Dr. Barclay remarks of the round-headed porpoise (*Delphinus melas*), that "its favourite food seems to be cuttle-fish, of which great quantities are generally found in the stomach." (*Bell's Brit. Quad.* 485.) In this species my friend Dr. Ball has likewise observed the remains of these cephalopods In Mr. Hyndman's possession are the beaks of cuttle-fish taken from the stomach of a whale (but of what species I have not learned) captured on the coast of Waterford some years ago. The consumption of these animals by at least two species of our Cetaceæ would thus seem to be considerable.

felt a scientific interest in the spectacle, had the opportunity of seeing the animal in a perfect state. During the progress of cutting up, on the day after its death, the body was still warm and smoking.

To the intelligent farmer whose property this whale became I showed all the figures of *Cetacea* in Mr. Bell's work, when he at once, from the narrow elongated snout, and head arising abruptly from it, identified the specimen with the *Hyperoodon*, objecting only to the snout not being represented so long comparatively as in the real animal. To another respectable farmer who had got its head I exhibited these figures, and he also singled out the *Hyperoodon*, considering the figure of Dale's specimen as more characteristic of the general form of the animal than that of Hunter's: the tail of the latter, however, being the better liked. The gape or opening of the mouth was remarked to be thus ⁓, or "like the letter *f*," teeth none, the snout shaped like a bottle: it was similarly described by our first informant. In a newspaper paragraph respecting this whale it was stated that "the blubber produced 140 gallons of oil, which were computed to be worth £20 sterling."

In connexion with the occurrence of this *Hyperoodon* on the coast of Down, a novel and interesting fact is to be recorded—that there evidently was a migration or simultaneous movement of these *Cetacea* towards the British shores during the last autumn, several individuals having within a very *few* weeks been obtained in England and Scotland, as well as Ireland; but all upon a limited range of coast bounding the Irish Sea and its vicinity. The first capture known to me is that of the individual already recorded. In the Northern Whig, published at Belfast on the 26th September, it was stated that "A bottle-nosed whale, 20 feet long, was last week left on the beach at Flimby, near Cockermouth." In the Belfast News-Letter of October 1st appeared the following notice,—"A whale captured near Liverpool.—On Tuesday last a whale was left by the receding tide on East Hoyle bank, and speedily captured by the fishermen. Its length is 24 feet; its girth round the centre of the body 13 feet."* Although this is not called the bottle-nosed species, it seems to me a fair presumption so to consider the specimen, as its dimensions accord with the other individuals taken about the same time, and of which one was obtained on the coast of the adjacent county of Cumberland. In the Belfast Commercial Chronicle of October 21st was this paragraph, copied from the Stranraer Advertiser:—

"*Capture of Whales in Lochryan.*—On Tuesday morning last, 15th of October,† a very unusual appearance presented itself in Kirkcolm. Two monsters of the deep, of the bottle-nosed description of whale, had come round the Scaur and embayed themselves; the receding tide swept its treacherous waters from under them, and finding themselves grounded their mighty exertions were truly terrific, yet unavailing for their extrication. Mr. Robertson of Clendry was the first who took notice of the errant strangers, and arming himself and retainers with pitch-

* In connexion with this paragraph it was observed—"On Friday two young whales were got in the Clyde—the one on the beach at Roseneath, the other above Dumbarton or West Ferry." Unfortunately no particulars are given that would lead to a knowledge of the species. About the same time it was mentioned in the newspapers that a whale proceeding southward had passed close to one of the packets plying between Holyhead and Dublin.

† About four weeks previous to this time a friend informed me that upon two successive days a whale (which he saw) appeared off Ballantrae (Ayrshire) some miles north of Lochryan; on the second day it was about two miles to the south of where it was seen on the preceding, and was still advancing southwards.

forks and knives, repaired to the scene of action, and commenced the terrible onslaught. The dying agonies of the mighty monsters were truly tremendous. Desperate from the repeated thrusts of the opponents, and from their inextricable position, their powerful tails were wrought with astonishing effect. The water (of which there was yet a quantity around them) was lashed into foam and agitation, the crested waves stretching to an incredible distance, while high in air the water ascended in one unbroken sheet. From their blow-holes the crimsoned water was sent in a jet, imposingly grand, to a great height. After similar and protracted writhings, with a kind of snort or roar, their fury subsided, and in a short time all was still. They were towed to the shore amidst the gaze of numerous and wondering spectators, a large number of whom arrived hourly to inspect them. A number of men were then employed to cut off the blubber, of which there were thirteen barrels, loading five carts. The dimensions of the largest fish were 24 feet 4 inches in length, and 16 feet at the thickest part in circumference; the smaller one about 16 feet long, and thick in proportion. The tail of the largest was 6½ feet in breadth."

It is very probable that other paragraphs to the same effect may have appeared in the newspapers, especially as those here introduced I observed merely on a casual perusal of some of those published in a provincial town. It is rarely that such notices are of any service to the naturalist, but the very peculiar form of the head of the animal under consideration (whence it has received the name of the *Bottle-nosed* Whale), taken in connexion with the dimensions stated, leaves no doubt in any instance here quoted that the *Hyperoodon* is alluded to. Were the size of the individual described about *one half* of what is reported, then would there be a doubt whether the captives might not have been the Bottle-nosed Dolphin (*Delphinus Tursio*, Fabr.), a much smaller species, having the snout prolonged somewhat like that of the *Hyperoodon*, and which is occasionally taken on the British coast.

The three *Hyperoodons* recorded to have occurred on the English shores appeared singly. The two particularly described by M. Baussard * were taken in company at Honfleur, and considered a mother and her young—the one was 23, the other 12, feet in length. Of the seven individuals captured on the Irish coast, they on two occasions appeared in pairs; and in one of the three instances here copied from newspapers two of these whales were secured at the same time. It would be interesting to know whether those which have so appeared were male and female—at all events it would seem that the species is not gregarious.

So very little of the history of the *Hyperoodon* is known, that it is hoped even the few particulars here recorded may prove an acceptable contribution."

And in the Annals for March, 1846, vol. xvii. p. 150, I added the following notice:—

"In a paper published in the Annals for February, 1840 (vol. iv. p. 375), I noticed seven Hyperoodons, the first of which had previously been most fully described by Dr. Jacob of Dublin as having been obtained on a limited portion of the coast of Ireland, comprised in less than the northern half of the eastern line of coast, or merely from the Bay of Belfast to that of Dublin inclusive. An eighth, about 24 feet in length, examined by Dr. G. J. Allman, was obtained at the island of Ireland's Eye, on the Dublin coast, on the 30th of October, 1842. I have now to record the occurrence of a ninth individual procured within the same range of coasts.

* F. Cuv. Hist. de Cét. pp. 242, 249.

Its capture was thus noticed in one of the Belfast newspapers, the Banner of Ulster, on Friday, Oct. 31, 1845:—

'*A Whale in Belfast Lough.*—On the morning of Wednesday last [29th October, 1845] the services of the coast-guard stationed at Cultra Point were called into active requisition by the appearance of—not a smuggler—but something 'very like a whale,' ploughing the waters a few hundred yards from the pier. * * * * Without loss of time a boat was manned by four or five of the coast-guard armed with harpoon, cutlass, carbine, and hatchet, resolved to make the stranger pay dearly for his visit. * * * After a good deal of manœuvring the men succeeded in bringing their boat alongside the enemy, and then commenced their assault upon him without mercy * * * and after a little show of opposition he attempted to make off, but his endeavours were fruitless. After receiving two or three shots, and a good many strokes with the harpoon, a grappling-iron was thrown over him and the boat was rowed shorewards amid the huzzas of the spectators, with the poor whale vanquished and weltering in his blood, which dyed the waters; and soon the retreating tide left him high and dry upon the beach. * * * It exhibited great tenacity of life, having survived six hours after being brought to land, though cut and hacked in an extreme degree. * * * On Wednesday and yesterday crowds of persons flocked from this town and other places to see it, where it lies on the shore at Cultra."

I was absent from home at the time, but my friend Mr. James Bryce, F. G. S., ever active and energetic, hastened to the beach where the animal was lying, took the measurements of it in detail, and subsequently repeated them under more favourable circumstances in the yard, in the town of Belfast, to which the animal was brought for exhibition, and where it attracted a large number of visitors for several days. Mr. Bryce had at this time careful drawings made of the *Hyperoodon* by his relative Mr. R. Young, which, together with his own notes, have been kindly placed in my hands. I happened to return home just in time to see the animal before it was cut up on the 8th of November. It is a male. Mr. Bryce's description is as follows:—

	Feet	Inches
Length, measured in a straight line from snout to tail	20	4
——— measured along the dorsal curve	23	4
Height, greatest	4	6
Girth, greatest	11	6
Breadth of forehead	3	0
Length of rostrum or snout		11
——— of mouth to rictus	1	7
Depth of each jaw at point		4
Eye from point of snout	3	1
Blow-hole, from point of snout (following dorsal profile)	3	9
———, in length (slightly crescentic points directed towards the head: it and the eyes in the same vertical plane)		6
Pectoral fins from base of snout	5	0
——— fins, space between them	1	7
——— fins in length, from base at upper side to point	2	2
——— fins in breadth		7
Dorsal fin distant from caudal fin, estimated from a straight line drawn from snout to tail	8	0
Dorsal fin, length at base	1	7
——— fin in height (points backward)	1	0
Caudal fin, greatest length	1	11
——— fin, greatest breadth	5	6
——— fin, greatest thickness		3
Aperture anterior to vent in length	1	0
——— of vent in length		6

'The marking at each side from behind the lip, extending under the chin in the direction of the belly, is fourteen inches in length; in breadth it is two inches anteriorly and nine inches posteriorly.* *Colour*, when quite recent, of a blackish lead hue, and the skin, which was exquisitely thin, beautifully polished like patent leather, and more especially so on the tail and caudal fin: it was merely of a lighter shade beneath, and not white. No teeth visible.'

Although no teeth could be seen when the animal was entire, the removal of the fleshy portion of the lower jaw exposed four of them towards its extremity. They are loose in their sockets, and so deeply sunk in the groove as not to be apparent above the bone when the jaw is viewed in profile. Though loose, the two front teeth may be stated as 7½ lines from the extremity of the jaw, and the hinder pair as 9 lines distant from them. So much has already been written on the teeth of this species that I shall content myself with merely calling attention to the very small size of the anterior pair in the present individual, a male upwards of twenty-three feet in length, compared with those represented in Owen's Odontography, pl. 88, fig. 1, although the *Hyperoodon* to which the latter belonged is said to have been immature, p. 347. The stomach of the Irish specimen was quite empty. It was believed that this animal, which was in the highest condition, would have been about five tons in weight; it produced above ninety gallons of oil: the entire skeleton has been preserved for the Belfast Museum.

Baussard's figure of the *Hyperoodon* (as repeated in F. Cuvier's Hist. Nat. Cétacés, pl. 17, fig. 1) would with some corrections represent this specimen; but it has seemed to me desirable to have an outline of it engraved from the drawing already alluded to, *zoologically* corrected by myself (pl. 4, fig. 2). The difference between Baussard's and the Irish specimen will be seen to consist in the latter being less elongate; in its dorsal fin being smaller and placed considerably further back; in its eye being round instead of oval, like the human eye, and in its being deficient in the ornament of eyebrows; also, in the spiracle being placed in the same vertical plane with the eye.

In my paper before alluded to (p. 379) a simultaneous movement or migration of Hyperoodons to the Irish Sea is recorded to have taken place in the autumn of 1839, not more than two however appearing in company. In connexion with this fact, I have on the present occasion only to notice the autumnal appearance of the species in another year, and the occurrence of these individuals on the same day, though in localities widely separated, the one being taken in Belfast Bay and the other in the Firth of Forth. Just as I reached Edinburgh on the 31st of October, and was conversing with Dr. P. Neill—who had likewise borne his part in describing British Whales—the body of a *Hyperoodon* to our astonishment appeared in view, and, as we learned, was about to be taken to the Zoological Garden, and exposed to the atmosphere during winter. The blubber and soft parts had previously been removed, the latter having been anatomically examined by Mr. John Goodsir, and "preparations" of them made for the University Museum, where the skeleton itself will eventually be placed. This is said to be the first known occurrence of the species on the eastern coast of

* These are evidently the same as the "two diverging furrows," described as "under the throat," in the *Physeter bidens* of Sowerby; they were said in the Irish specimen under consideration to have resembled the healed-up deep wounds in the stem of a large tree.

Scotland. From the gentleman just named and Dr. Melville, his most able assistant in the Museum of Comparative Anatomy, &c., in Edinburgh University, I have learned that this whale, killed in the Firth of Forth on the 29th of October, 'measured 28½ feet in a line from the tip of the snout to the middle of the caudal fin, not following the curvature, but as if a plumb-line were dropped from one point to the other. It was a female, and was accompanied by a young female (nine feet long measured in the same way) which was still sucking: the mammæ of the mother were distended with milk, which appeared very rich in butter, and tasted pleasantly.' Dr. Melville adds, that he 'forgot to ascertain the point at which the triangular process of skin under the throat commenced posteriorly, but anteriorly it reached to the middle of the lower jaw; the large teeth were not visible, being hid under the gum in both.' We have another instance of a mother and her young being taken, in those described by Baussard as stranded at Honfleur. I am not aware of the occurrence of any of these whales upon our coast in the autumn or winter just passed, excepting the three noticed in this communication."

In connexion with the foregoing notes as to the food of the *Hyperoodon* and other whales it should be stated, that the stomach of the adult animal killed in the Firth of Forth (October, 1845) contained a vast number of the beaks of cuttle-fishes, perhaps what would fill two quarts. I saw these in the University, and specimens were subsequently sent to me.

Mr. F. D. Bennet, in his Narrative of a Whaling Voyage round the Globe, observed respecting the spermaceti whale that "their ordinary food is the cuttle-fish or 'squid' (*Sepia*), many kinds of which are rejected from the stomach of the whale when the latter is attacked by the boats, as well as after death and during the process of removing the blubber." Vol. ii. p. 175.

The same author says at p. 236 of the *Delphinus Perona*, a sp. attaining six feet in length, and seen by him only in the higher south latitudes, that in every individual he examined "the stomach was distended by a vast number of calmars or flying squid (*Loligo*)."

Since the publication of my note respecting the Hyperoodon taken in Belfast Bay (October, 1845), I have learned that two of them appeared together at Cultra. They were seen going up the bay past Holywood in company but not close together, the one being to one side of and a little way behind the other. On returning back towards the mouth of the Bay, the one which was taken grounded itself, and the other got off.—They returned outwards in the manner described. The in-shore one met with its death—it made a great attempt in resistance, until overpowered.

March 9, 1846.—I took the following measurement of the *Hyperoodon* belonging to the Belfast Museum and described by me in Ann. Nat. Hist. for March, 1846:—

	ft.	in.
Length of cranium from occiput to end of snout .	4	0½ *
Breadth	2	1½
Height	1	11½
Distance between bony crests of superior maxillaries	0	5

These bony crests, five inches apart at nearest point of contact, are very thick: they gradually thicken from the summit downwards—from *about* † one inch above to four inches and a half at thickest part.

* This is not positive, a little being broken off the extremity; I made allowance for this in the above.

† I say *about*, as the bone slopes away on either side.

The following paragraph which appeared in the Derry Sentinel (January, 1842), may have related to this species:—

"WHALE CAUGHT AT NEWTOWN-CUNNINGHAM.—A bottle-nosed whale, about twelve feet in length, was caught last week at the embankment near Newtown-Cunningham. It has been purchased by Captain Coppin for the purpose of extracting the oil, and we believe may be seen at his establishment on the Strand road."

THE SPERMACETI WHALE, *Physeter macrocephalus*, Linn.,

Has been taken on the ocean coasts of the island.

In the Philosophical Transactions for 1695-6, Dr. Molyneux remarks,

"Nor is the kind of whale-fish that * * affords the true spermaceti a stranger to the coast of Ireland that respects America. This we may properly, I think, * * call the *Cetus dentatus*, from its large solid white teeth fixed only in the lower jaw, to distinguish it from the species that gives the whalebone * * of which kind likewise there have been three or four stranded in my time, but on the eastern coast of this country that regards England.

There have been three of this kind [*Cetus dentatus*] taken to my knowledge in the space of the six years, all on the western coast of this country; one near Coleraine in the County of Antrim, another about Shipharbour in the County of Donegal, and a third in Aug., 1691, 71 feet long (exceeding that discovered by Clusius 19 feet), towards Ballyshannon, where Lough Erne discharges its waters into the western ocean." Vol. xix. p. 508.

In Smith's History of Cork, published in 1750, it is observed that a whale,

"which I take by the account I heard of it to be the *Balæna major*, or spermaceti whale, Ray, Synop. Pisc. 15, was a few winters ago cast on shore near Castlehaven, and towards 60 feet long." Vol. ii. p. 299.

Arthur Young in his Tour in Ireland, made in the years 1776—1779, remarks that,

"In all the bays on the coast [of Donegal] in March and April there are many whales, *the bone sort;* they appear on the coast in February, and go off to the northward the beginning of May; sometimes they are in great plenty, and in November to February there are many spermaceti whales;* this is what induced Thomas Nesbit, Esq., of Kilmacredon, to enter into a scheme for establishing a fishery on the coast, and in executing it was the inventor of the gun-harpoon. Mr. Nesbit first used the gun-harpoon for killing whales in the year 1756 * * * [In this year] one whale was caught by the hand-harpoon * * * In 1761, with the gun-harpoon, he killed three whales and got them all; after which he every year killed some, except one year, when he killed forty-two sun-fish† in one week, each of which yielded from half a ton to a ton of oil. Mr. Nesbit has since given it up,‡ not from want of success in the mode of taking the whales, but from being put by his partners, for want of knowledge in the business, to useless expenses. From many experiments he brought the operation to such perfection, that for some years he never missed a whale, nor failed of

* At the beginning of August, 1845, a large whale was seen by Mr. Hyndman and others between Horn Head and Tory Island off Donegal.

† Basking shark. *Selachus maximus*, Cuv.

‡ The following paragraphs appeared in 1776, copied in 1839, from a book of extracts made by Dr. Aquila Smith:—"A LARGE WHALE. By letters from the Co. Donegal we have an account that Mr. Thos. Nesbit killed and brought into port, the 11th inst., a large whale; and as many others now appear on the coast, there is reason to hope for a successful season in that fishery."—*Freeman's Journal*, May 17, 1776.

"We hear from Port in the Co. of Donegal that Mr. Thos. Nesbit had brought in a whale there which measured 63 feet in length."—*Freeman's Journal*, June 10, 1776.

holding her by the harpoon: he had for some time ill success, from firing when too near, for the harpoon does not then fly true, but at 14 or 15 yards' distance, which is what he would choose, it flies straight; has killed several at 25 yards."

Other interesting particulars are given, and it is finally remarked:—

"I have been the more particular in giving an account of this undertaking, because the Society for the Encouragement of Arts, &c. in London has long since given premiums for the invention of the gun-harpoon, supposing it to be original." P. 157.

In Rutty's Natural History of the County of Dublin it is stated that one of these whales—

"was cast upon our coast in the year 1766, and the *sperma* was taken from it and refined here in Dublin." Vol. i. p. 369.

In 1837 Dr. R. Ball mentioned to me that he had often heard of an immense whale which was taken or cast ashore at Youghal about seventy years before that time. It was said to have been seventy feet in length, and its height so great that his grandfather, a tall man, when on horseback beside the whale, held up his whip, and the top of it could not be seen from the opposite side of the animal. The spermaceti was said to have been carried away in buckets-full.

Mr. John Nimmo of Roundstone, Connemara, informed me in 1837, that a spermaceti whale was driven ashore about fifteen years previously in a sandy bay near that village. Mr. Martin, on whose property it was stranded, was stated to have realized £50 by the spermaceti.

High-finned Cachalot, *Physeter Tursio*, Linn.

In the Annals of Natural History for November, 1846, vol. xviii., p. 310, I published the following communication relative to this species:—

"I am happy to be enabled to join my friend Professor Bell (see British Mammalia, p. 512) in maintaining the existence of this species, which Cuvier, from the unsatisfactory nature of the data respecting it, believed to be fictitious:—even yet no proper description or figure has been published.

Professor Bell comes to his conclusion on information to which Cuvier had not access, and which was communicated to him by Mr. Barclay of Zetland. The occurrence of the species on the coast of Ireland was made known to me by Capt. Thomas Walker, who replied as follows to a letter requesting the fullest information on the subject:—'Kilmore, Bridgetown, Wexford, July 28, 1846:—As to the high-finned Cachalots, I saw them myself about seven years ago, and only know them to have been so from the descriptions in works of natural history which I consulted to find out what they were. There were either five or seven of them—I now forget which number, but I think the latter, and two of them were much larger than the rest, apparently about twenty-five feet long, from comparing them with the length of the boat in which I was. When first I saw one I thought it was a cot [small flat-bottomed boat] at anchor with her tarred sail made up to the mast; more then rose, and they crossed in a long file the bows of my boat so close, that I put about the boat (though of seven tons burden) fearing they would upset her. When I put about they were not more than three or four yards from me: the back fin appeared about ten or twelve feet high, and had either before or behind it (I cannot now recollect which) a round white spot on the back; all the rest of the body that showed was black like a porpoise. I did not see the head or tail, nor more than a portion of the back; they went steadily, not rolling like a porpoise.'

There certainly is no proof here that the species noticed was a *Physeter*, but that it was what has been called the High-finned Cachalot does not in my opinion admit of doubt. In Templeton's Catalogue of the Vertebrate Animals

of Ireland, the *Physeter Tursio* is noticed, but merely in the following words: —'Thrown ashore on the western coast occasionally.'"

On the 15th Nov. 1846, Major Walker wrote me that "the round white spot either before or behind the back fin and *quite close* to it was not an accidental mark, as it appeared in all—either five or seven—of them." He remarks, "The great height and narrowness of the back fin led me, on first perceiving it, to believe that it was a fishing cot with the black tarred sail made up to the mast." * And in a subsequent letter the same gentleman mentioned that he had met the captain of a Sunderland vessel to whom the high-finned cachalot was known, and who confirmed his recollection as to the narrowness and great height of the fin.

The Common Whale, *Balæna Mysticetus*, Linn.,

Is said to have been taken on the coast on different occasions, but no description to enable a correct judgment to be arrived at respecting the species has come under my inspection.

The simple fact of this and the *Balænoptera* producing whalebone has led to both species being referred to under one name.

I shall give some notices which may possibly apply to this species.

"Here [at Slime Head 'the furthest into the sea, and most western point of those parts'] a great *whale* was cast in, the last day of December, 1650; and another about forty years before."—*O'Flaherty's H-'Iar Connaught*, written in 1684, p. 109.

"Large Whale.—There was lately killed on the N. W. coast of this kingdom, in the Bay of Enver near Donegal, a large whale, 62 feet long, 15 feet deep as it lay, its tongue filled eleven hogsheads. The whalebone is computed to be worth 8 or 900 pounds. The blubber filled 62 rum puncheons."—*Repository of the Medico-Philosophical Society*,† No. 29. M.S. in Library of R. I. Academy.‡

In May, 1838, I was informed by my venerable friend the late Dr. M'Donnell of Belfast, that he had heard on good authority of the occurrence upwards of forty years previously of two large whales—one of them seventy feet long—on the northern coast of Antrim. Within the last twelve years a portion of a small whale taken at Portstewart was sent him, and from his description of this animal I considered it to have been *B. Mysticetus*.

Mr. John Nimmo of Roundstone (Co. Galway) saw the remains of what he termed a baleen whale on Deer Island in 1837; the blubber was boiled and the oil extracted: it was claimed by the lord of the soil, Mr. Martin.

Either the *B. Mysticetus* or *Balænoptera* will be found included with the spermaceti whale in extracts which I have made from the writings of Dr. Molyneux and Arthur Young.

The following notices of whales, the species of which must remain unknown, may be introduced here.

In 1782 or 1783 a very old gentlemen of my acquaintance saw a whale, seventy feet in length, on the beach of Glenarm Bay—it may be the same

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* In the paper as already published there was a wood-cut exhibiting the appearance of the High-finned Cachalot, as seen by Capt. Walker.

† This Society existed from 1756—1784; the last date in the Repository is March 2, 1772.—*Aq. Smith.*

‡ Copied from a book of extracts lent me for the purpose by Dr. Aquila Smith of Dublin, Nov. 1839.

individual that Dr. M'Donnell alluded to. Portions of the skeleton were preserved for a long time at Glenarm Castle. Mr. Templeton, as I learn from his journal, saw these in July, 1808, and was told that the animal had whalebone in its jaws. He adds that "the one caught near Larne was a young animal of the same species," alluding, it is presumed, to that taken about the last-named year.

Dr. J. D. Marshall was told at the island of Rathlin in 1834 that the *B. Mysticetus* is occasionally seen in the channel between the island and Batty Castle, though of late years very rarely. Part of the skeleton of one was then to be seen on the shore of Church Bay in the island.

Dr. Michael Ferrar recollects that about the year 1810, when he was a boy, he was put into the mouth of a whale which was pulled up close to the quay at Larne.

Large whales are not very unfrequently still seen from the more northern coast of Antrim, but of what species we are ignorant. During a period of six weeks in the summer of 1837, one—or what was considered to be the same individual—was frequently seen off Drumnasole, though sometimes not appearing for a week.

"Capture of a Whale.—On Friday sen., while the crew of one of the Dublin trawlers were fishing off Dunmore, Co. Waterford, they captured a whale measuring 36 feet in length and 7½ feet in thickness."—*N. Whig*, Aug. 24, 1844.

The *B. mysticetus* visits the coasts of Great Britain much less frequently than formerly.

The following paragraphs, respecting the occurrence of whales on the coast of Ireland, are taken from the periodical press.

"Whales on the South-West Coast of Ireland.—Within the last six years, several whales have been seen on the Southern and Western parts of this and the County of Kerry, one of which ran on shore near Glandore, and another, found floating at sea, was towed into Crookhaven by a hooker, both producing an average quantity of oil. Whales have visited the coast during the summer months, and been frequently seen. On the 29th of last month five of them were observed at one time sporting within the circumference of four miles of the revenue cutter *Badger*, when off the Skelligs Rocks. (*Cork Constitution.*)"—*N. Whig*, May 11, 1850.

"A Whale in the Bay of Galway.—For the last few months a whale has been disporting his bulky proportions in our bay, to the great destruction of its finny inhabitants, and the surprise and terror of our fishermen, who look upon their strange visitor as something supernatural. It is probable that this monster came to our shores in pursuit of herring shoals, and in company with the whale that was captured, some time ago, on the coast of Connemara."—*N. Whig*, July 24, 1851.

"Whales on the West Coast.—As a party of Sligo gentlemen were yachting in the early part of the week, in the bays of Sligo and Donegal, they met a number of whales in pursuit of herrings and their fry. They were of vast dimensions, and at one time no less than six appeared above water, one, at least 60 feet in length, being within 50 yards of the *Ventura*, the yacht which the party were in. (*Sligo Journal.*)"—*Belfast Mercury*, Sep. 27, 1851.

"On Sunday sen., the carcase of a whale was hauled into Bantry harbour. It is supposed it had been killed by a swordfish, as a wound, such as would be made by one, was discovered in its belly. Its dimensions are ninety-four feet nine inches long, forty-two feet girt; breadth of tail, twenty-four feet; length of lower jaw, twelve; breadth between the eyes (one of which is broken by a wound), fifteen feet."—*N. Whig*, Dec. 23, 1851.

"A Whale in Bangor Bay, Co. Down.—For more than ten days previous to the late stormy weather, a large whale, of about fifty or sixty feet long, and of proportionate breadth, has been cruising about in the [Belfast] lough, immediately

off Bangor Bay, to which locality he had been probably attracted by the herring fry, then swimming in every direction, pursued by a powerful force of seagulls of every description, some gannets, and an immense body of puffins and other divers; flocks of which were dispersed in all directions, making unceasing assaults upon the different shoals of fry, as they approach the surface."—*N. Whig*, Oct. 1, 1846.

Rorqual, *Balænoptera Boops*, Linn. (sp.)

Individuals of this genus *Balænoptera* have occurred on the ocean coasts of Ireland.

In Scoresby's Arctic Regions it is stated that "three were killed on the north-west coast of Ireland in the year 1762, and two in 1763, vol. i. p. 483. Possibly the note from the Repository of the Medico-Philosophical Society given under *Balæna Mysticetus* may refer to one of these. In Smith's Cork (1750) the following note appeared, which is brought under Balænoptera in Dr. Harvey's Fauna of Cork (1845):—

"*Balæna Rondeletii; Gesneri et aliorum; Willoughby.* The Whale. This fish has been cast up in different places in the West of this county; several years ago a prodigious large one, 85 feet long, was stranded at Crookhaven, the jaw-bones of which are still to be seen forming the posts and arch of a gate at Colonel Beecher's seat at Affadown."

In the Freeman's Journal, May 26, 1767, the following paragraph appeared:—

"Whale 85 feet long.—May 17, was killed near Castletownsend in the County of Cork a whale whose length is 85 feet; from his eye, which is not larger than the eye of an horse, to his nose is 19 feet, and the length of his jaw-bone is 25 feet." *

Dr. Jacob in the Dublin Philosophical Journal for Nov. 1825 (vol. i. p. 342) gives a very full and elaborate description, accompanied by figures, of a female "*Balæna rostrata*," seventy feet in length, zoologically and anatomically examined by him in the month of April of that year. It "was found floating at some distance from Innisturk, an island about ten miles southward of Newport Bay, in the County of Mayo." Dr. Jacob here enters fully into the question of species, and is disposed to believe that Sibbald's two whales called *Balæna Boops* and *B. musculus* by Linnæus; Hunter's "*B. rostrata* of Fabricius;" those described by Mr. P. Neill (Wern. Mem. vol. i. p. 202), Scoresby (Arctic Regions, vol. i. p. 485), and other authors, are of the same species with that which he examined. He gives a table of the relative admeasurements of the individuals described in the works just named.

The relative size of the head to the whole length indicates a *Balænoptera* rather than a *Balæna Mysticetus*.—In the Northern Whig of 9 Sept. 1841, it was stated that "a whale of considerable size floated dead into the Bay of Dundrum on Friday last," and it is added that "this is the second whale which has been drifted ashore in the neighbourhood of late." Some years before (1836 or 1837?), as I was informed by Mr. Edward Benn, a large whale came in among the rocks at Ardglass, a few miles distant from the last-named place. It was imagined that the animal could never get to sea again, and the people of the village hastily collected all their destructive implements, and fastening them to ropes drove them into

* Copied in 1839 from a book of extracts of Dr. Aquila Smith, kindly lent me for the purpose. The above dimensions, positive and relative, indicate a *Balænoptera*.

the poor whale, but the tide coming in and floating him off, he went to sea, carrying with him every rope, "pick," and similar implement that Ardglass contained. He had suffered badly, however, and was washed ashore dead, at some distance from the scene of action.

Dr. Burkitt of Waterford mentioned in a letter to Dr. Ball, dated 11th Dec. 1835, the recent occurrence there of two individuals—one 25, the other 16, feet in length—of the *B. Boops*, and that a much larger whale, supposed to be the mother, remained near the shore for some days. Dr. G. J. Allman (now Professor of Zoology, in University, Edinburgh) informed me in Nov. 1839 that in the preceding month of September a whale about 34 feet in length was cast ashore to the east of Kinsale Head. It was in a very mutilated state when he saw it, so that no description could be attempted; the plates of whalebone were observed to be very short, about nine inches in length, but possibly imperfect, indicating, however, its being of this genus.

In the Belfast Newsletter of 17 Sept. 1841, the following paragraph appeared :—

"We mentioned in a former number that a large *whale* of the true *Balæna* species was drifted ashore last week at Annalong, a sea-coast village about half way between Newcastle and Kilkeel [County Down]. It measured 47 feet in length, while the head alone, from the top of the nose to the remote extremity of the skull, was no less than 12 feet in length. This immense monster had evidently been driven from the Northern Sea, as it was quite dead when discovered, and had a harpoon sticking in it. It has proved a rich prize to the poor fishermen of the district in which it was found. Several whales, of inferior size to the one mentioned above, have been caught alive this season about the shores of Dundrum and the adjacent coasts."

The following paragraph from the Galway Vindicator, copied into the Northern Whig of 7th December, 1843, probably relates to one of these whales as the largest of our species, although it is more than doubtful that both size and value have been not a little exaggerated.

"WHALES.—In the course of last week, an enormous dead whale, measuring 157 feet in length, was stranded in fourteen feet of water, at Spiddle, on the western coast, about eight or nine miles from this town, calculated to be worth £1200; but before Peter Comyn, Esq., of Spiddle, on whose property it floated in, had been aware of it, the country people from the adjacent districts, as well as the inhabitants of Spiddle themselves, had it nearly cut up and taken away —rendering it of little comparative value."—*Galway Vindicator.*

In the following instance, supposing the descriptions to apply to the same individual, we have an exaggeration of 10 feet in a newspaper paragraph. According to the N. Whig's extract of 21 May, 1844, from the Southern Reporter, it appeared that

"A huge whale, 84 feet long and 44 in girth, weighing at least 50 tons, was captured by the fishermen, at Glendore, County Cork, on Sunday week, to whom it will prove a rich prize."—*N. Whig*, May 21, 1844—From *Southern Reporter?*

But from the Cork Fauna we learn that

"It measured 74 feet in length and 30 in girth. It was a male. Length of head, about 18 feet; gape from point of nose to angle of mouth, 16 feet. The longest plates of baleen were $2\frac{1}{2}$ feet, the shortest 6 inches. Tail, 18 feet from tip to tip. One small thick dorsal fin at a distance of 9 feet from the tail. The colour was black above, and a mottled grey on the under surface. The skin of the belly and under parts was thrown into very distinct longitudinal folds. The pectoral fins were of enormous power, but their measurement is not given."

These particulars were supplied to Dr. Harvey by George Armstrong

and J. Fitz-Henry Townsend, Esqs., respecting a whale which got amongst the rocks of Glandor harbour in the summer of 1844 and was taken.

Major Walker (the Lodge, Kyle, Enniscorthy) wrote me on 28 July, 1846, that a friend (Mr. Howlin) and his son who sailed in their yacht to Dunmore at the mouth of Waterford harbour in the summer of 1844, told him on their return that the people were exhibiting a small whale on the shore, and that the white belly was all in longitudinal stripes or plates. On looking to Bell's Cetacea we concluded (Major W. remarks) that it must be the Rorqual.

"A whale caught on the western coast of Ireland.—General Thomson of the Little Killeries, Connemara, has killed a large whale sixty-five feet long and twenty-four feet broad, having a large fin on the back about ten feet from the tail."—*N. Whig*, Oct. 3, 1846.

"A Whale caught in Strangford Lough.—We have received the following from a correspondent:—On Wednesday last, a whale, which is fully 30 *feet long*, got stranded on Ringhaddy Sound. It has *a fin on the back, towards the tail, rising about twelve inches. The tail is*, as near as I could calculate, *about six feet broad.* Before the tide had quite left the creature, a man drove a crow-bar into one of its eyes. This caused it to writhe in agony, and drive mud, stones, and water to a prodigious height, completely drenching the individual who inflicted the wound upon it. Shortly afterwards several balls were fired into its head; and a stick, three feet long and as thick as a man's wrist, was totally hidden in one of its blowers."—*N. Whig*, July 1, 1843.

Dr. Gordon, who had been aware of the capture of the whale referred to in the last paragraph, informed me in 1846 that he had obtained some of the whalebone and ribs of it—one piece of the former in his possession was 15½ inches long, of solid matter—18 inches to tip of hair like bristles.—It was 6 inches in breadth at the base. The ribs measured 5 feet in length.

All the species of Cetacea yet known as Irish (with the exception of *Physeter Tursio*) are figured in Bell's British Quadrupeds, and all (with the exception of *Physeter Tursio* and *Delphinus Tursio*) are likewise illustrated in the Naturalist's Library, Volume on Whales.

The crania not figured in the former work, viz. those of *Delphinus Delphis, Phocæna Orca, P. Melas*, and *Balænoptera Boops*, will be found in Cuv. Oss. Foss., and those of the first and third of these species are also represented in Fred. Cuv. Hist. Cétacés.

From the preceding notices it appears that even the larger Cetacea occur on the Irish coasts not unfrequently. I do not however consider as certain any species of which the measurements have not been given, so as to show the relative proportions of the different parts of the body, or which have not come under the actual examination of the Zoologist; and unfortunately for science such investigations are seldom permitted, as the captors generally commence at once to cut into their victims. It is to be hoped that naturalists will for the future attend more to these animals.

CLASS REPTILIA.

TESTUDINATA.

THE LOGGERHEAD TURTLE, Shaw, Gen. Zool. vol. iii. p. 85, pl. 23; *Chelonia Caouana*, Schweigger; *Testudo Caretta*, Linn.,

Has been taken alive on the coast, as mentioned in the following note, which I published in the Annals of Natural History, vol. v. p. 8.

"To the kindness of H. H. Dombrain, Esq., of Dublin, I owe the opportunity of examining a turtle of this species hitherto unnoticed on the British shores, which was obtained on the coast of Donegal in May, 1838, and soon afterwards came into his possession. The specimen, about a foot in length, was taken by a man engaged in collecting sea-weed for manure, and who, finding the hook at the end of the long pole used for 'hauling in the rack' had caught in something, carefully drew it towards him, when the captive proved to be a living turtle, whose eye the hook had entered. Dr. R. Ball informs me that a turtle of this species, in his collection, was taken alive in the sea near Youghal; but he has been inclined to regard it merely as an individual washed off the deck of a vessel, or one that had escaped from the cord which was intended to secure it, when (as is a common custom on board ship) it may have been committed to the sea for the benefit of a swim. However, as both the specimens which have been procured on the Irish coast are of the same species, and one which according to Dumeril and Bibron is very common in the Mediterranean, and of occasional occurrence in the Atlantic Ocean, they may by the natural influence of winds and waves have been carried to our shores. This remark would, from the circumstance of its frequenting the same seas, likewise apply to the much rarer species, the Leathery Turtle, *Sphargis coriacea*, which has been taken on the English coast. The Hawk's-Bill Turtle, *Chelonia imbricata*, now included in the British Fauna, may, more probably than the other two species, have been washed off the decks of vessels or outlived their wreck, its native abode being so far remote from the British seas as the West Indies and the Indian Ocean." *

THE COMMON LIZARD, OR VIVIPAROUS LIZARD, *Zootoca vivipara*, Wagl. Bell; *Lacerta agilis*, Berkenh. Jenyns,

Is common in suitable localities throughout the island.

I have seen specimens from all quarters; and the result of my examinations of several of these appears in the following note from my Journal:—

* "All the localities noted by Dumeril and Bibron, except Havanna, are within, or bordering on, the Indian Ocean."—*Erpétologie Générale*, tome ii. p. 551.

"27th May, 1837.—Eight Irish lizards which I have examined, and varying in size from 4½ to 7 inches, viz. six specimens from the Counties of Down and Antrim, one from Dublin, and one from Cork, and also a Scotch specimen sent to me from Portpatrick by Captain Fayrer, R. N. are identical with *Lacerta agilis* of Mr. Jenyns, as described in his Man. Brit. Vert. p. 293. It should however be observed that instead of the two middle rows of abdominal lamellæ bring merely 'a little narrower than the adjoining ones,' they are in all these specimens about one half the breadth only of the row on either side. In some the number of plates in the collar is 8, in others 9; and these plates vary much in relative size, being in several specimens somewhat uniform in this respect, and in others the central ones being much the largest."

When at Clifden, Connemara, on 24th July, 1840, I observed one of these lizards basking in the sun; and I have seen them doing the same near Ventnor in the Isle of Wight.

On examining several individuals of this species received from Aberarder (Scotland) I made the following note, in March, 1846.

"I find these specimens differing in the collar plates and in the relative size of those in the abdominal rows.

"Bell's description, (Hist. Brit. Repts. p. 36,) that the collar plates are nearly equal, applies to the most of my specimens, but in one specimen they gradually increase in size to the centre, where is one large scale double the size of that on either side of it, and in form like two of them joined together. In most of these specimens the middle and centre rows are narrower than the intermediate, as Bell describes; but in the specimen already alluded to the largest scales are in the outer rows. At the same time this individual is certainly not distinct in species from the others, although they differ trivially from each other in the characters alluded to."

In Sep. 1837, Dr. Ball obtained a black variety of the common lizard, captured in the County of Wicklow, and which he exhibited at the meeting of the British Association held at Liverpool in that month. Unfortunately this animal escaped from the box in which he had it confined whilst travelling.

Of the "Green Lizard," noticed by Ray as found in Ireland, I know nothing. All he says of the species is:

"Lacertus viridis; the Green Lizard, a colore ita dicitur: vulgari major est. In Italia frequentissimi habentur. Inveniuntur etiam in Hibernia. An Lacertus Hibernicus *Mus. Tradescanti.*"—Ray, Synop. Anim. Quad. p. 264. (1693.)

Our common lizard being occasionally of a greenish hue, may possibly have led to the mistake, as persons have in several instances told me that they knew a green lizard to be a native, but this always proved to be the common species. Mr. Bell in his British Reptiles suggests that "a green variety of *Lacerta agilis*, Linn., was probably alluded to: this is more likely than that the true *L. viridis* was meant; but the *L. agilis*, Linn., has not been distinguished as an Irish species." It has but lately been added to the British Fauna, and from specimens obtained in the South of England.

William Bottomley, Esq., of Belfast has favoured me with the following note:

"Lizards. In the Lazzaretto in Ancona there were a number of lizards living in the holes in the wall. We amused ourselves with watching them running about in the sunshine, and found that when we sang to them they came out of their holes, and appeared to lose their alarm."

Turtle.

The subjoined notes relate to Turtles, the species of which were not accurately determined:

For some months previous to December, 1836, my relative Richard Langtry, Esq., kept one of these animals,—supposed to be the "Snapping Turtle,"—living in a pond at Fortwilliam, near Belfast. It died on the 5th of that month, and on its being lifted out of the water I observed several specimens of *Limneus pereger* stationary upon it.—I examined the eggs taken from this turtle, and found about 70, measuring from one-third of an inch to one inch and a quarter in diameter,—many of them of this latter size. Besides these there were numbers—upwards I should think of 200—smaller, down to the size of pin-heads.

In the Northern Whig of 12th July, 1849, the following notice appears:

"A fine young turtle was caught in the Channel, on Friday, contiguous to the city. *Cork Constitution.*"

Order *Ophidia* (Serpents).

Ireland has ever been free from the presence of Ophidian reptiles. As there is no physical obstacle to their being indigenous to the island, it can only be said, that as all animals have geographical limits assigned to them, so these have Great Britain as their western boundary, within her parallel of latitude. Mr. Bell, when about to publish his History of British Reptiles, having applied to me for information respecting the several species inhabiting Ireland, I supplied him with the following note, which he has given in the work just mentioned (p. 54).

"In this order (*Ophidia*) there is not now, nor I believe ever was there, any species indigenous to Ireland.—In the Edinburgh New Philosophical Journal for April, 1835 (vol. xviii. p. 373), it is remarked, 'We have learned from good authority that a recent importation of snakes has been made into Ireland, and that at present they are multiplying rapidly within a few miles of the tomb of St. Patrick.' I never heard of this circumstance until it was published, and subsequently endeavoured to ascertain its truth by inquiring of the persons about Downpatrick (where the tomb of St. Patrick is) who are best acquainted with these subjects, not one of whom had ever heard of snakes being in the neighbourhood.—Recollecting that about the year 1831 a snake (*Natrix torquata*) immediately after being killed at Milecross was brought by some country-people in great consternation to my friend Dr. I. L. Drummond, I thought this might be one of those alluded to, and recently made inquiry of James Cleland, Esq., of Rathgael House, Co. Down, twenty-five miles distant in a direct line from Downpatrick, respecting snakes said to have been turned out by him. I was favoured by that gentleman with the following satisfactory reply:—'The report of my having introduced snakes into this country is correct. Being curious to ascertain whether the climate of Ireland was destructive to that class of reptiles, about six years ago I purchased half a dozen of them in Covent Garden market in London. They had been taken some time and were quite tame and familiar. I turned them out in my garden; they immediately rambled away; one of them was killed at Milecross, three miles distant, in about a week after its liberation, and three others were shortly afterwards killed within that distance of the place where they were turned out; and it is highly probable that the remaining two met with a similar fate, falling victims to a reward which it appears was offered for their destruction.'"

In reference to the above communication Mr. Bell remarks:—

"Such is the most accurate and authentic account which I have yet obtained respecting this curious fact in the geographical distribution of these animals; and it certainly does not appear that the failure of these attempts to introduce snakes into Ireland is to be attributed to anything connected with climate or other local circumstances, but rather to the prejudices of the inhabitants which led to their destruction; nor is there reason to believe that their absence from Ireland is other than purely accidental."

For remarks on Reptiles in Ireland and St. Patrick, see the Irish Version of Nennius, p. 218 and 219.—Published by Irish Archæol. Society, 1848.

The Blind-worm or Slow-worm, *Anguis fragilis*, Linn.

I have taken this species in Wales near Tremadoc. I saw one wanting the black dorsal line entirely.—It has been brought to me in Ayrshire; and when at Aberarder (Inverness-shire) I was told that it was not uncommon there.

The Ringed Snake, *Natrix torquata*, Ray.

Mr. Davis, writing from Clonmel in February, 1846, informed me that the ringed snake "has been several times introduced, but seldom if ever survives the first winter. Some hundreds were said to have been liberated in a demesne near this a few years ago, but not one was to be met with in twelve months after."

In the Isle of Wight it seems to be particularly common.

The Common Viper or Adder, *Pelius Berus*, Merr.

I have occasionally met with this species when shooting in the neighbourhood of Ballantrae, Ayrshire.

I was told at Aberarder in 1842 that they are found there, but are scarce, the blind-worm being more common.

In August, 1848, I received a very fine adder killed by my friend Robert Callwell, Esq., in the island of Islay, during that month.

Mr. Sinclaire states that when he was at this island many years ago with two Irish friends, these gentlemen amused themselves by shooting snakes along the shore,—an amusement which Irishmen only—having no such "vermin" at home—would think of.

The Common Frog, *Rana temporaria*, Linn.

This species has for a long period been disseminated over the island. Of its having been introduced to Ireland there cannot be a doubt.

In Gough's edition of Camden's Britannia, vol. iv. p. 234, "The following lines by St. Donatus, Bishop of Etruria, who died *anno Dom.* 840," are given. They refer to Ireland.

"Ursorum rabies nulla est ibi; sæva leonum
Semina nec unquam Scotica terra tulit:
Nulla venena nocent, nec serpens serpit in herba,
Nec conquesta canit garrula rana lacu."

"No savage bear with lawless fury roves,
No raging lion through her sacred groves;
No poison there infects, no scaly snake
Creeps through the grass, nor frog annoys the lake."

It is stated in Rutty's Natural History of Dublin (vol. i. p. 290) that the Frog "was brought into this kingdom in 1699 by Dr. Guithers." This gentleman, who was one of the fellows of Trinity College, Dublin, is said

to have procured frog's spawn from England and placed it in a ditch in the University Park, whence the species gradually spread over the entire country. The circumstance is noticed in the Dublin Med. and Chem. Jour. vol. v. N. 15, p. 481, as quoted in Edinb. Phil. Jour. vol. xviii. p. 372, also in Bell's History of British Reptiles, p. 86, where will be found an extract from the writings of Swift in which the introduction of these animals is referred to. The year 1696 is mentioned by the latter authorities as that in which Dr. Guithers made the importation.

In Stuart's History of Armagh the following passage occurs,—

"The first frog which was ever seen in this country made its appearance in a pasture-field near Waterford about the year 1630, and is noticed by Colgan in a work printed in 1647 [Tria. Thom. p. 256]."—*Stuart's Armagh*, p. 504.

Dubourdieu, in his History of Down, published in 1802, remarks,—

"I was assured by an old gentleman of the greatest veracity, who died some years ago above the age of eighty, that the first frogs he ever saw were in a well near Moira, from whence he brought some of them to Waringstown, where, until that time, they had never been seen; the quickness with which they multiplied, and the rapidity with which they spread, were surprising." P. 316.

The following note, which has been supplied to me by a friend, has reference to the County of Antrim.

"My grandmother, who I find was born 8th January, 1726, used to tell me, that when a girl at school she was taken some distance to see a frog which was exhibited as a show. Her father lived at Ballycorr in this county, so this applies to the North of Ireland."

When at Florence Court, in October, 1840, Lord Enniskillen told me that frogs brought from the top of a neighbouring hill thirteen hundred feet high had been seen by an eminent Professor when there, who was disposed to believe them distinct from the common species. Lord E. had some brought for me from the locality, and on comparing these with specimens taken in the demesne, and subsequently with others, I could not perceive any material difference.

A *frog* taken in Ayrshire and compared with the Florence Court specimens (high and low ground) does not to my mind exhibit specific differences: its colour certainly is different from that of others, it being more spotted; but frogs differ greatly in this respect. It possesses the "elongated patch of brown or brownish black behind the eyes," which Jenyns and Bell consider the most constant mark exhibited in the common frog.—*Bell*, p. 100.

Aug. 12, 1845.—In two pools in quarries about Sandy Braes, County Antrim, I saw numbers of *tadpoles* of true form, and some others exhibiting the mere rudiments of the 2nd pair or "hind legs:" others that had just put off the tadpole and were veritable frogs were seen on the dry margin of the pools, but not one *in* the water. Baron Watershausen was with me.

On 11th October, 1839, I heard frogs croaking at Fortwilliam, near Belfast. I was within a short distance of them and saw them.

Feb. 17, 1850.—Although the winter has been very severe, and the weather of late, and to-day, cold and inclement, I never saw a greater number of frogs together than there were in and about a stagnant pool on the north side of the old Malone road, near to Lismoyne entrance gate. They had cast a profusion of spawn, and appeared with their heads and white throats above the surface of the water. The multitudinous croaking of several hundreds of them at the same time had a singular and,

in the gusty day, rather a subdued sound, much resembling, and mistaken by my companion (I. R. G.) for, the noise of a railway train. They were stated by a little boy who lives close by and was observing them with us, to have been there for five or six days; *not*, he said, on this day week.

Feb. 16, 1851.—The winter, unlike last, has been remarkably mild; happening with the same companion to pass the same spot to-day, we remarked the frogs just as described above.

With respect to the distribution of this species over the islands contiguous to the Irish coast, it may be mentioned that in 1834 I observed frogs in Achil; but Mr. G. C. Hyndman informs me that they are not found in Tory Island nor in the largest of the Copeland Islands.

In an article on the Common Frog, written in a very pleasing and popular style by my friend Dr. R. Ball, and published in the Irish Penny Journal, Oct. 3, 1840, after stating that "it contributes materially to check the increase of slugs and worms," he says,

"I have often vindicated the frog from charges brought against him by gardeners. I have been shown a strawberry, and desired to look at the mischief he had done. I have pointed out that the edge where he was accused of biting out a piece was not only dry but smaller than the interior of the cavity, and it therefore could not be formed by a bite. I have then shown other strawberries with similar wounds, in which small black slugs were feeding, and I have cut up the supposed strawberry-devouring frog, slain by the gardener, and shown in his stomach, with several earthworms, a number of little black slugs of the species alluded to, but not one bit of fruit; thus proving, I hope, that the cultivator of strawberries ought for his own sake to be the protector of frogs." P. 110.

The Common Toad, *Bufo vulgaris*, Laur.,

Though so common in Great Britain, is not found in Ireland.

I have observed toads to be numerous in Ayrshire; and in 1832 I was told that they frequent Aberarder.

The Natter-Jack Toad, *Bufo Calamita*, Laur.,

Is found in several parts of the County of Kerry, where it is believed to be indigenous.

In the 9th volume of the Magazine of Natural History (24 Feb. 1836), p. 316, Mr. J. T. Mackay published the following notice of this animal:—

"I have lately got from Kerry living specimens of the Irish toad, which I announced at the meeting of the British Association to have observed at Calnafersy, twelve miles from Killarney, in 1805. It is not the common English toad [as announced at the Association meeting. W. T.], but the natter-jack (*Bufo Rubetra*). * * * It was found by me 30 years ago in the place mentioned, where it was known to the peasantry as the black frog; and it was inquiring for them under this name that led to the discovery. Mr. Macgillicuddy, the gentleman who brought me the living specimens about a month ago, informs me that they bury themselves under the dry sand in the winter, and may be sometimes seen in summer evenings running about like mice in the houses, which they sometimes enter."

Dr. Ball of Dublin informed me several years ago that he had seen a specimen of this toad which was taken at Rosbegh in the year 1836. The person who captured it stated that it was one of some hundreds observed by him in the same locality. Dr. Ball subsequently, at the Zoological Gardens, Phœnix Park, turned out sixty of them; but never saw one of them afterwards.

Richard Chute, Esq., of Blennerville (County Kerry), gave me the following information by letter dated 31 March, 1846:—

"I believe the natter-jack is indigenous to Kerry, though there is an old tradition that a ship at one time brought a lot of them and let them go at the head of Dingle Bay. This is borne out by the fact that it is the only part of Kerry that they are to be met in: a district extending from the Sandhills of Inch and Rosbegh at the head of the bay (where they are most numerous) to Carrignaferay, about ten miles in length of low marshy ground, and about the same number in breadth."

THE COMMON WARTY-NEWT, *Great Water-Newt, Triton cristatus*, Laur.,

Was noticed by Templeton: to myself it is unknown.

THE COMMON SMOOTH-NEWT, OR EFT, *Lissotriton punctatus*, Bell,

Although abundant in some localities, is not universally distributed over the island.

Dr. Ball informed me in Sept. 1840, that this species is common about Dublin, but that he had never seen one at or near Youghal.

Mr. M'Calla found them near Tuam, but not in Connemara. I observed some of these animals in County Sligo, and in March, 1847, I saw one which had been obtained by Dr. Allman near Roscrea, said by him to be the most southern locality known for the species in Ireland.

In the Cork Fauna of Dr. Harvey no species of newt appears, and I was informed by Mr. Chute in 1846 that he did not think there were any in Kerry.

Rutty, in his Natural History of the County of Dublin, mentions the "Water-ask, or Arglogher, *Lacertus aquaticus niger*," as "found in a ditch going to Milltown." This author's "*Lacertus*, Eft, Newt, or Ask," is compounded of the lizard and common newt.

I have known the latter to be taken plentifully by boys, in the most simple manner, merely by impaling a worm on a crooked pin, which is tied to a string and immersed in the water. In this way a stagnant pool may soon be thinned of its numbers. In White's Selbourne, Letter 17, the following observation occurs:—

"It is to be remembered that the *Salamandra aquatica* of Ray (the water newt or eft) will frequently bite at the angler's bait, and is often caught on his hook."

When looking for fluviatile shells in the vicinity of Belfast (between Crawfordsburn and Craigavad) so early as 3rd Sept. 1833, I found two of these newts secreted under large stones in moist situations.

They were almost torpid, and when touched remained quite passive. On lifting one of them up and placing it in my hand, the only appearance of life which it exhibited, with the exception of its eyes being open, was a scarcely perceptible motion of the limbs. The day being warm, I laid it on a rock upon which the sun shone brilliantly; and it was highly interesting to observe the animal gradually recovering its powers, and eventually gathering sufficient strength to crawl off and again conceal itself. On the 26th of the same month I perceived a newt of this species at Wolfhill, near Belfast, in a pond of spring-water situated a few paces only from the source of the spring. It was swimming in an awkward, wriggling manner, and pausing for a few minutes with its fore-feet placed, as if for rest, on every fallen leaf or twig floating on the water, although these substances were occasionally not more than a foot apart. I knew not whether to at-

tribute this apparent weakness in the creature to its being untowardly aroused from a partial torpidity, like the others, or to its presence in the cold spring-water being accidental.

Sept. 23, 1846.—I saw one of these newts, in Dr. Lankester's, London, take a common house-fly offered it on the point of a pen, and was told that it ate three of these flies daily; unless they were alive it did not care for them. These animals lived for months with Dr. L.*

March, 1846.—Again looking over my specimens of newts collected about Belfast, I am not satisfied about their species. They certainly do not agree with any of Bell's—in fact they do not strictly come under either his *Triton* or *Lissotriton*.

Their crest is continuous in the male (*Lissotriton*).

They are slightly warty (*Triton*).

They have a series of distant pores along each side (*Triton*).

The upper lip overhangs the lower at the sides, which it is described as not doing in *L. punctatus*.

The general appearance of my specimens is just that of *L. punctatus*, Bell, p. 132, but viewed critically they differ as above.

The palmated Smooth-newt, *Lissotriton palmipes*, Bell.

In 1841 I published the following note in the Annals of Natural History, vol. vii. p. 478.

"*Lissotriton palmipes*, Bell? Palmated smooth-newt. On questioning Mr. William M'Calla, of Roundstone, Connemara, (a most intelligent collector of objects of Natural History,) respecting the species of newts observed by him, he replied—'I am positive of there being two species of *Triton* in this country, one of which is the *T. punctatus* of Jenyns's Manual, and the rarer with us; the more common species is by far larger and of a richer colour; it is nearly double the size of *T. punctatus*: the crest is far larger and is not notched; the feet are webbed. To convince you that I have not confounded the young and adult of the same species, I may state that I observed them in the breeding season, and met with females of both species.' A fair inference from these remarks, I think, is, that *Lissotriton palmipes* is the animal alluded to. My correspondent had not seen Mr. Bell's work on British Reptiles."

Mr. M'Calla subsequently informed me that he had not found this animal in Connemara, but in "the plain district" of Galway.

I have not obtained any further information relative to its existence in Ireland. It was first distinguished, at least as British, by Mr. J. E. Gray, and was described in Jenyns's Manual, in 1835.

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* A newt lived about nine years in a fern-house belonging to Dr. Ball; it had no access to water, and never during that time acquired the fins necessary for properly assuming its aquatic functions.—Ed.

FISHES OF IRELAND.

ORDER I.—ACANTHOPTERYGII.

Family PERCIDÆ.

THE PERCH, *Perca fluviatilis*, Linn.,

Is found from North to South of the island, but is not universally distributed through the lakes and rivers like some other species. It is stated to have been introduced into Ireland, but this I am disposed to doubt, as it is so very widely distributed. Great numbers are taken at Lough Neagh (in the Pollan nets), and also in the River Shannon. Three of my own friends, on one occasion, took sixteen dozen of these fishes in Ballydrain Lake, near Belfast, between breakfast and dinner hours.

In August, 1844, I saw a perch which was obtained in Belfast Bay, a mile below the town. The water is there almost purely salt; but, as the River Lagan is plentifully stocked with this fish, and flows into the estuary, it is probable that the specimen alluded to may have been washed down during a flood: similar occurrences have been observed elsewhere. The perch is in little esteem here as an article of food.

THE BASSE,* *Labrax Lupus*, Cuv.,

Is a well-known fish on the coast; its numbers decreasing northwards.

It is probably found around Ireland, but I can only give it positively as occurring from the coast of Londonderry round by the east line of the Island to Cork, inclusive.

I have seen specimens in Belfast market, which were taken on the coasts of Derry, Antrim, and Down, from March to October—both months included—rarely more than one, two, or three at a time, and only a few throughout one season.

The stomach of a specimen taken in a salmon net at Coleraine, in June, 1840, contained two fishes, from five to six inches long, and of the family *Gadidæ*. They were so deep for their length that they must have been either *Gadus luscus*, or *G. minutus*. Lug-worms (*Lumbricus marinus*) are used as bait for the Basse, and a few are thus caught on lines; but the greater number are taken in the nets with salmon, sea-trout, and mullet. In Belfast Bay they are most frequently caught with the last-named fish, and hence their local names already mentioned.

A friend, who has often eaten of this fish here, remarks that it requires to be fresh to be approved of, and that on even the second day after capture it is oily and strong.

* Called "White Mullet," and "King of the Mullet," in Belfast Bay.

March 27th, 1851.

I saw a Basse, of 14 lbs. weight, in Belfast market, that was taken within a mile of the town. It was in very fine condition, and a female, containing a vast mass of ova, smaller than the smallest clover-seed. The fishmonger remarked that he had never seen such a quantity in any fish.

The number of fin rays in several specimens examined were—1st D. 8 or 9; 2nd D. 1+11 to 13; P. 16 to 18; V. 1+5; A. 3+10 or 11; C. 16 or 17.

THE LESSER WEEVER OR STING-FISH,* *Trachinus Vipera*, Cuv.,

Is found from North to South, but appears to be chiefly known along the eastern and southern shores. Dr. Ball informs me that, at Youghal, where this species is abundant, it is often taken in sprat nets; sometimes it is caught by boys, fishing with small hooks at the quays. He has not seen any so large as those mentioned by Fleming—10 to 12 inches in length. In reference to the alleged venomous quality of the dorsal spines of this fish, Dr. Ball made the following observations in a public lecture on "The Fishes of Ireland," delivered by him before the Royal Zoological Society of Ireland, in Dublin, in May, 1849, from which occasional extracts will be found in the following pages:—

"The *Trachinus Vipera* is much dreaded by fishermen, who attribute poisonous injury to the sting from the spines of its first dorsal fin, which certainly has an unpleasant threatening aspect; nevertheless, I am induced to think that the difficulties in healing wounds from this and other spines of fishes are not the results of virus, but rather of the unfavourable circumstances under which such lacerated punctures are inflicted."

An interesting memoir on the stinging property of this species was published by Professor Allman, in the Ann. Nat. Hist. for November, 1840; and there is an excellent account of the stinging apparatus, &c., in the 5th vol. (1849) of the Proceedings of the Literary and Philosophical Society of Liverpool.

THE GREATER WEEVER, *Trachinus Draco*, Linn.,

Has not yet been discovered on our shores.

THE STRIPED RED MULLET, OR STRIPED SURMULLET, *Mullus Surmuletus*, Linn.

Several specimens of this fish have been obtained by Mr. W. Andrews, off Ventry Harbour, two of which were presented by that gentleman to the Dublin Nat. Hist. Society, in 1849. In the Summer of 1850, Robert Warren, Esq., of Killiney, procured a fish of this species in Dublin Bay, and sent it to Dr. Ball. It is now in the Dublin University Museum.

Previous to the capture of the specimens above mentioned, I thought it singular that there should not be any positive knowledge of the occurrence of this species in Ireland, more especially on our southern coasts. Dr. Patrick Browne included it in his list of Irish fishes (1774); but I am not aware of any other record of it as a native fish.

* Called the Stony Cobbler at Youghal.—*Dr. Ball.*

Family LORICATI.

THE RED GURNARD, OR CUCKOO GURNARD, *Trigla Pini*, Bloch,

Is, probably, taken all around the coast. I have seen it brought in by fishermen, at various localities, from Derry, in the North, round the eastern coast, to Cork, in the South.

Early in Spring, and late in Autumn, this species is most abundant in Belfast market; but a few may be seen there in every month throughout the year. They not uncommonly reach 15 inches in length, and sometimes attain to 17 inches here. Cuv. and Val. remark (t. iv. p. 26) that those brought to Paris rarely exceed a foot in length.

The stomachs of twelve specimens which I examined at various seasons contained the following food :—1st, a spider crab; 2nd, small crabs; 3rd, 40 small crustacea, one-half inch long; and a small crab (*Portunus pusillus?*); 4th, remains of three small fishes, resembling sand-eels, a crab, a shrimp-like crustacean, and an *Aphrodita aculeata;* 5th, a small fish, and thirty-five shrimp-like crustaceans; 6th, two small fish, one flat-fish, and a shrimp-like crustacean; 7th, filled with shrimp-like crustacea; 8th, a crab; 9th, the remains of small *brachyurous* crustacea; 10th, the remains of crustacea, among which were shrimps; 11th, do., do.; 12th, the remains of two small Pogges (*Aspidophori*).

The form and indentations of the snout of this species are very different in individuals of similar size; some being rounded off at the edge; spines inconspicuous; in others, the spines very prominent, and a square appearance intermediate between that just noticed and *T. Lyra*, yet all true *T. Pini*.

Of six specimens (three males and three females) which I examined on 9th October, 1838, the greatest breadth of snout and development of spines on it were exhibited on the three smaller ones, which were males. Perhaps the males may generally have the broader and better armed snout.

The irides of all these specimens were golden orange, and the general colour bright red. The ova seemed to the naked eye to be very little developed in any of them.

A fish of this species which I obtained on 10th March, 1835, agreed precisely with Mr. Yarrell's description in the third paragraph, p. 35, of his work on British Fishes (1st Ed.), except that the lateral line is *not* "bifurcated at the caudal end," but terminates in a single line. It was a female; the roe being largely developed.

The different species of gurnards have been much overlooked, the terms red and grey being applied to five or to six, according as we consider *T. Cuculus* and *T. Gurnardus* identical or otherwise. Templeton saw that there were four sp.; but, on giving attention to the subject, I found that there were two more, not uncommon in the North, that he had not included, viz. *T. Pini* and *T. lineata*. In reference to the numbers occurring on our coasts, the species stand thus :—1st, the Grey Gurnard, *Trigla Gurnardus* (synonymous with *T. Cuculus*, Bloch), is the most numerous; 2nd, the Sapphirine Gurnard, *Trigla Hirundo;* 3rd, the Red or Cuckoo Gurnard, *Trigla Pini;* 4th, the Streaked Gurnard, *Trigla lineata;* 5th, the Piper, *Trigla Lyra;* 6th, the Little Gurnard, *Trigla pœciloptera*.

I cannot but think that by *T. Lyra*, mentioned by Templeton as "taken with the hook on our coast, but in no great numbers," he meant *T. Pini*,

as he omits this sp., which is commonly brought to Belfast market; whereas, in the North, I have never met with *T. Lyra*.

August 29, 1850.

Trigla Pini, and Hirundo. I saw one of the former and several of the latter in Belfast market, and was much struck with the narrowness of the head of the former, as contrasted with that of the latter. The development of spines on the snout of *T. Hirundo* differ very much; the largest examples to-day had them least developed.

March 19, 1836.

Specimen obtained in Belfast market:—Length, 15 inches; D. 9-18 (reckoning two last from same base as 1); P. 11-3; V. 1+6; A. 17; C. 11.

April 13, 1838.

Do., 16½ inches in length.

D. 8-18; P. 11-3; V. 1+5; A. 16.

The hinder half of this specimen was greyish, like the *T. Hirundo* (of which a small one was taken with it), the anterior half, including head, a mixture of grey and scarlet. It was a female, the ova half the size of small clover-seed.

THE STREAKED GURNARD, OR LINEATED GURNARD, *Trigla lineata*, Gmel. Don. Yarr.,

Is occasionally taken from North to South. When announcing this species as an addition to the Irish Fauna, in 1835 (Zool. Pro. p. 79), I was only able to give the following note respecting it:—

"Lineated Gurnard, *Trigla lineata*, Linn.—On the 28th of February, 1835, Dr. J. D. Marshall, being attracted by the peculiar colour of a gurnard in Belfast market, kindly communicated the circumstance to me, and, on inspection of the fish, I found it to be the *Trigla lineata*, and learned that it had been taken in Strangford Lough. Its length is 16½ inches. On the 3rd of March I procured another specimen, but of smaller dimensions, from the same locality."

Since the publication of the above note, many examples of this fish have come under my notice; a few having been every year captured on various parts of the coast of Down, but chiefly at Killough. [One was taken by Dr. Ball at Youghal in 1819. ED.]

The specimens noted by me were taken during the months of July, August, October, December, January, February, and March.

Contents of Five Stomachs examined:—Substance having the appearance of vegetable food, and a young sole, about three inches in length; crab-like crustacea; fifteen full-grown specimens of shrimp-like crustacea, and three small brachyurous crustacea, one of them a full-grown "Long-horned Crab," Penn.; two full-sized *Portunus pusillus*, and two or three other crabs; the remains (some almost perfect) of *Portunus pusillus* from full size down.

An example of this fish, which I obtained on 28th February, 1838, was thus described in a note which I made respecting it when recent:—

Its length is 16½ inches; B. 7; D. 10+17 (reckoning two last, which touch at base, as 2); P. 11 (reckoning two first, which touch at base, as 2); and 3 free, V. 1-5; A. 16 (reckoning two last as above); C. 12? 25 scales on each side of the dorsal fin; iris, blackish purple, excepting round the pupil, where it is golden.

Colour:—Head, back, and sides, as low as midway between medial and

belly, grey, of various shades, very faintly tinged with pale red, and varied with a few small roundish black spots; lower portion of sides bright rose red; under parts white, intermixed with red towards the tail. D., P., and C. fins marbled with red and very dark grey; V. white at base, but gradually changing to red, the extremity having a rich tinge of this colour. Anal fin all red, 3 free—P. coral red, for an inch from tip. P. fins pass the anal one inch.

Yarrell (Brit. Fish., p. 46) notices this species as being found "on our southern, and occasionally on our eastern, coasts." In addition to the above Irish localities, it may be stated that, in October, 1844, I saw in a fishmonger's shop, in Glasgow, a *T. lineata*, which had been taken at Ayr. Jenyns (p. 340) says:—"Found as far North as Scotland." Parnell (p. 15) remarks that it has *not* been met with in Scotland.

The Sapphirine Gurnard, *Trigla Hirundo*, Bloch,

Is procured around the coast.

This gurnard is brought to Belfast market chiefly in the Spring and Autumn. It is said to be in best condition during the months of May and June, and to spawn in November. It is most usually called the Red Gurnard, in common with the two species already treated of; but, when of a greyish colour, it is named the *Grey* Gurnard, and is the only fish known by that designation in Belfast market, where the *T. Gurnardus* is always called the *Knoud*.

At Youghal, the Sapphirine Gurnards are, according to my friend, Dr. Ball, distinguished by the name of "Tubs," which, Mr. Yarrell says, is applied to the gurnards in the South of England.—*Brit. Fish.*, p. 48. (2nd Ed.)

In October, 1848, I received a Sordid Dragonet (*Callionymus Dracunculus*) which was taken out of the stomach of a Sapphirine Gurnard.

The most usual mode of capture of the latter fish is in trawl-nets upon sandy bottoms, where flat-fish are usually taken. I have not, however, seen more than a dozen brought to Belfast market in a morning, although it ranks second in numbers among the gurnards on the north-east coast, and is the common gurnard of this market. The usual price is from 1*s.* to 1*s.* 6*d.*; 2*s.* 6*d.* being given for very large ones. No distinction is made in this respect between the three Red Gurnards.

This species not uncommonly attains to two feet in length here, and has been taken of 14 lbs. weight.

Although I was correct in noticing this fish as an addition to the Irish Fauna in the Zool. Proc. for 1835 (p. 79), the subsequent publication of Mr. Templeton's catalogue showed that it had been known to him. I have seen this species in Autumn taken in salmon-nets in Ballantrae, Ayrshire; and have observed others on a different part of the coast of this County.

A specimen in the Belfast Museum is 21 inches in length; D. 9, 16; P. 10 or 11; V. 1-5; A. 15; C. 16 well-developed rays. Pectoral fin, 5¼ inches from base to extremity; 5 inches in diameter, when expanded; 3 appendages between V. and P. fins; lateral line not prickly, as described by Donovan. The species is well figured by this author (Brit. Fish., pl. 1); but, in the present specimen, the spines on snout are not so regular as in his figure.

In April, 1835, I examined the contents of a fishing-boat at Howth, and found that it contained, amongst a variety of other fishes, three kinds of

English and Irish specimens may be considered insufficient to warrant such a conclusion—that they are distinct.

The more prominent differences are—in the form of the snout; in the body of my specimens being very much rougher than that of *T. Hirundo*, with which Mr. Couch's fish agrees in this respect; in their lateral line being strongly and acutely serrated, although, in the individual described by this gentleman, it 'is but faintly, though distinctly, roughened.'

Finally, it may be observed, with reference to this last fish being 'hitherto confounded with *T. Blochii*,' that the examination of my specimens convinces me that the *T. Cuculus* of Bloch, Cuvier, Pennant,* Montagu, Fleming, and Jenyns represents but one species; that Mr. Yarrell's *T. Blochii*, excepting what is borrowed from Risso, is also identical, and, judging from Mr. Couch's description, that his *Trigla* is a different species."

Dr. Parnell having called attention to the apparent identity of *Trigla Cuculus*, Bl., with the *T. Gurnardus* of authors, I communicated the following remarks to the Annals N. H. (vol. ii. p. 313) :—

"When noticing the *T. Cuculus* as an addition to the Fauna of Ireland, in the first volume of the 'Annals' † (p. 348), I embraced the opportunity of offering some remarks on the confusion that existed about the species. In so far, the observations then made may not be useless; but as it was looked upon in the ordinary light of being a species distinct from *T. Gurnardus*, of which it has very recently been shown to be merely the young, I feel that a few notes are requisite as supplementary."

In a paper on some species of British fishes read by Dr. Parnell before the meeting of the British Association of Newcastle, the author stated that an examination of a series of specimens, embracing all sizes, had led him to the conclusion that *T. Cuculus*, Bl. (*T. Blochii*, Yarr.), is only the young of *T. Gurnardus*; and to him alone, I believe, is this highly interesting discovery due, for such, in consequence of the manner in which it is effected, I conceive it to be. ‡ Having lately procured a series of specimens, that I might, for my own satisfaction, examine into this question, I shall here give the results. The following extract from the Histoire Naturelle des Poissons of Cuvier and Valenciennes, by whom they are considered

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* Between the figures and descriptions of Bloch and Pennant there is some disparity; the latter author describes two spines on each side of the snout, the former four, which number my specimens possess. Bloch describes the lateral line as consisting of "*écailles épaisses, larges*," &c., which mine exhibit; whilst Pennant observes that "the side-line [is] nearly smooth." Bloch again describes the caudal fin as forked, and figures it very much so; Pennant states that it is "almost even at the end," which it is in the individuals under consideration.

† One oversight was here committed. Mr. Jenyns is mentioned in company with other authors as not having described the relative length of the first and second rays of the first D. fin to each other; but, although this is not alluded to in his Manual, under the head of *T. Cuculus* (a circumstance which led to the remark), the relative differences only between this species and *T. Gurnardus* being described, rendered any observation on this point unnecessary, when a similarity was considered to prevail in this character. For a similar reason, Cuv. and Val. did not particularize the relative length of these rays.

‡ In the number of specimens of each species, independently of the beautiful manner in which they are preserved, Dr. Parnell's collection of British fishes stands quite unrivalled. In these *Triglæ* is a notable instance of the advantage of a series of different sizes, the young and old fish being so different, that without having traced the changes from youth upwards we could hardly believe in the modification which really takes place.

an Irish fish, and which I then considered as specifically distinct from *Trigla Gurnardus*:—

"TRIGLA CUCULUS, Bloch,* *T. Blochii*, Yarr., Red Gurnard.

Of this gurnard, two small specimens, taken at Youghal, County Cork, early in the Summer of 1835, have, along with many other fishes from the same locality, been kindly submitted to my examination by Dr. Ball of Dublin.

They are respectively 3 and 3½ inches in length. The number of rays in their fins are—

D. 8—19; P. 10, and 3; V. 1|5; A. 18, and 19; C. 10 (and 11).

A black spot is conspicuous on the membrane, from 3rd to 5th ray of 1st D. fin. P. fins extending so far as to be on a line with the origin of A. fin.† Dorsal spines, 27. Lateral line strongly serrated. 'Whole body rough' (as described by Montagu, Wern. Mem. vol. ii. p. 459), in consequence of spinous scales. Other characters—first D. ray slightly serrated, &c., as given by Cuvier and Valenciennes, Hist. des Pois., t. iv. p. 68, 69: in this work, the relative length of the 1st and 2nd rays of the 1st D. fin is not mentioned,‡ nor is it in the descriptions of Bloch, Montagu, Fleming, or Jenyns. Mr. Yarrell, not having a specimen for examination, states, on the authority of Risso, 'that the first spinous ray of the first dorsal fin is the longest' (Brit. Fish. vol. i. p. 51), and so figures it; but, in both the specimens under consideration, the 2nd ray of that fin is longest, thus corresponding in this important character with Pennant's figure of the species. See Red Gurnard, in Brit. Zool., vol. iii. pl. 57, Ed. 1776, and pl. 66, Ed. 1812.

In the Magazine of Natural History for September, 1836 (p. 463), Mr. Couch has given 'a description of the characteristics of a kind of *Trigla*, hitherto confounded with *T. Blochii*.' As it is from the description only of this species that the opinion of Mr. Couch was formed, it may be stated, as affording additional evidence of the correctness of his views, that, after a critical comparison of the specimens under consideration with his description, I am satisfied—although the great disparity in size between the

* The *T. Cuculus*, Bl., appears inadvertently in Mr. Templeton's catalogue of "Irish Vertebrate Animals" (Mag. Nat. Hist., N. S., vol. i. p. 409), the species meant being the *T. Pini*, Bl.

† These are generally described as not reaching so far as the vent, but their superior length in the present instance is, probably, consequent on the specimens being so young, as in several other genera of fishes I have remarked the P. fins in very young individuals to be much longer proportionally than they are in adult specimens.

‡ Notwithstanding the trouble taken by Cuv. and Val. in clearing up the synonyma of the *Triglæ*, and which has been so ably done, there is still a little confusion in one point respecting this species. At p. 70 it is remarked that Risso has well described it; yet on a comparison instituted between the *T. Cuculus* and *T. Gurnardus*, there is nothing said of a difference in the length of the rays of the 1st D. fin. The "exactitude" of Pennant is, at the same time, acknowledged, although he represents the 2nd ray of this fin to be the longest, as Risso does the 1st. From this I should infer that Risso's character of "*radiis pinna dorsali anteriore longissimus*" has been overlooked. And, besides, Bloch's figure of the *T. Cuculus*, exhibiting the 1st and 2nd rays of this fin of equal length, is criticised by Cuv. and Val., and no remark made upon this discrepancy. Neither in Bloch's description is it stated that this species differs from other *Triglæ* in the relative length of these fin-rays.

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as distinct species, may in the first place be desirable. 'Leur tête est la même, ses granulations sont semblables, les dentelures des lobes de leur museau sont tout aussi distinctes, et les points de leurs pièces operculaires et de leur épaule tout aussi aiguës; mais les trois premières épines de leur dorsale n'ont pas, comme dans le gurnard gris, les côtés granulés ou chagrinés: on ne voit qu'une dentelure à peine perceptible sur le tranchant antérieur des deux premières. Les crêtes des écailles qui garnissent leur fossette dorsale sont entières et sans crénelures, et se terminent chacune par une simple pointe. Celles des écailles de leur ligne latérale ne sont pas non plus crénelées comme dans les gurnards gris, mais ont deux à trois dents de scie, dont une est plus saillante et plus aiguë que les autres. Tout le reste est parfaitement conformé de même dans les deux espèces.'—Article *T. Cuculus*, tome iv. p. 68.

T. Cuculus.

No. 1 = 2½ inches long. Colour red, "with a conspicuous black spot on the upper part of the first dorsal," extending from the 3rd to the 5th ray. A few denticles on the 1st D. ray only; all the scales on the D. ridge entire, each being a sharp spine directed backwards; scales of the lateral line not crenated, but consisting of a series of hooked spines similarly directed.

Nos. 2 and 3* = 3 and 3¼ inches long. Colour red; a conspicuous black spot from 3rd to 5th ray of first D. fin. Scales of D. ridge and lateral line as in No. 1; no denticles on D. rays in No. 2; the rays in No. 3 imperfect.

Intermediate between T. Cuculus and T. Gurnardus.

No. 4 = 7 inches long. Colour dark grey; black spot of first D. fin very conspicuous. Two anterior scales of D. ridge slightly denticulated; the remainder simple; scales occupying the anterior part of lateral line, for about an inch in extent, crenated; remainder as in Nos. 1—3; first D. ray denticulated, and to a greater extent than in No. 1.

No. 5 = 9 inches long. Male, colour greyish-red; a conspicuous black spot on first D. fin. The few anterior scales only of the D. ridge slightly denticulated; anterior portion of every scale on the lateral line crenated, but each terminating in a hooked spine. 1st and 2nd D. rays denticulated, points on the 1st increasing in number.†

T. Gurnardus.

No. 6 = 11 inches long. Female, colour blackish-grey; a black spot on D. fin. Scales on D. ridge all crenated, points directed upwards; those on the lateral line all crenated, occasional scales throughout its length terminating in a hooked spine. 3 anterior D. rays crenated.

No. 7 = 11½ inches long. Male, colour greyish-red; black spot on 1st D. fin. Scales throughout D. ridge crenated, but nearly all of them having the terminal hooked spine; scales on lateral line all crenated, but, as in the D. scales, all except those occupying the anterior inch terminated by a spine; 1st and 2nd anterior rays only of 1st D. granulated.

No. 8 = 13½ inches long. Colour blackish-grey, with a slight tinge of pale-red over it; 1st D. fin generally dusky. Scales of D. ridge crenated,

* The specimens described as *T. Cuculus* in the Annals, vol. i. 348.

† Since this was procured, Dr. Parnell has favoured me with a specimen of similar size, and which, being in the transition state, admirably shows the characters of both species.

all the points directed upwards; scales throughout lateral line crenated, many of them on the hinder $\frac{3}{5}$rds of its length terminating in a spine; 1st 3 D. rays granulated throughout almost their entire length; 4th and 5th rays partially granulated.

No. 9 = 13½ inches long. Female, colour dark-grey, varied with yellow; D. fin generally blackish, but of a darker hue where the black spot usually occurs. Scales on D. ridge crenated throughout; points directed upwards; D. scales as in No. 8; 1st and 2nd D. rays granulated nearly throughout their length, 3rd and 4th slightly so about the middle.

No. 10 =14 inches long. Female, colour grey, varied with yellow; 1st D. fin with a black spot. Scales on D. ridge and lateral line as in last; four anterior rays of 1st D. fin conspicuously granulated, 5th partially so about the middle.

No. 11 = 15 inches long. Female, colour dark-grey, varied by yellow; 1st D. fin generally pale dusky.* Scales on D. ridge and lateral line as in last; 3 anterior rays of 1st D. fin strongly granulated throughout almost their entire length, 4th and 5th granulated for more than half their length, 6th granulated on one side. No. 6, 11 inches long, was considerably darker in colour than the three last.

Thus the *T. Cuculus* may be traced gradually passing into the *T. Gurnardus*, until this species appears fully developed. It may further be perceived, that as this fish increases in size the granulations extend over the rays of the first dorsal fin, and are not confined, as described by authors, to the three or four anterior ones only. So far as my observation extends, the red colour assigned to the *T. Cuculus* is not peculiar to the species at any age; and individuals of this hue may be looked upon as occasional varieties:—from 2½ up to 12½ † inches in length, I have seen specimens of a reddish colour. Considered relatively to the length of body, the pectoral fins are larger in young than in adult individuals; in those of considerable size they often extend so far as to be on a line with the vent.

Sketches of the form of the scales of the dorsal ridge and lateral line of these gurnards, in their various stages, accompanied the foregoing communication, but were accidentally overlooked by the Editor, who, however, inserted them in the 3rd volume of the Annals, p. 45.

For the believers in *T. Cuculus* as a distinct species, it may be stated that it has been taken on the north-east coast; also at Dublin and Youghal (Dr. Ball); and Mr. M'Calla, in October, 1840, stated that he had found at Roundstone three specimens in the stomach of a hake, but had not seen it taken there with a bait: the black spot on D. fin was present in the three.

Mr. W. Andrews, of Dublin, by letter, dated 26th March, 1850, informed me as follows:—

"I have recently received numerous specimens of the young of *Trigla Gurnardus*. Many of these are identical with Yarrell's figure of *T. Blochii*, in every respect, save in the spine of the first dorsal ray not being the longest. This I suspect to be an error, for I do not think that any of the gurnards possess that peculiarity. I have dissected a great many young specimens lately received, and find that they are of that stage of growth

* The recent colours of all but Nos. 1—3 are here given.

† This specimen may be described as tinged with red over the ordinary grey colour which appears on the back and upper part of the sides in *T. Gurnardus*; on the lower part of the sides, and to near the ventral profile, it was of a deep rose colour; all the fins too had reddish markings.

that the parents must have spawned in January and December. I have obtained the young of similar size in September and October; hence they must spawn at different seasons, or twice in the year. I send you a young specimen, which I have examined. You will find that in the spinous processes of the head and serrations of the dorsal ridges it possesses all the characteristics of the mature fish."

THE LITTLE GURNARD, *Trigla pœciloptera*, Cuv. and Val.

In the Zool. Proc. for 1837, I published the following notice of an Irish specimen of this fish—the first (and hitherto the only) one procured in the British Islands:—

* "*Trigla pœciloptera*, Cuv. and Val. Little Gurnard.

Amongst a number of fishes submitted to my examination by Mr. Ball is a gurnard, apparently of this species, which was taken at Youghal, I believe, along with sprats (*Clupea Sprattus*), early in the Summer of 1835. In *form* it agrees in every character by which the *T. pœciloptera* is said to be distinguished (Cuv. and Val. *Hist. des Pois.*, t. iv. p. 447). Judging from its present appearance, I have little doubt that when recent it would in *colour* also have corresponded. Its length is 2 inches; D. 10 (last extremely short)—15; P. 10—3, free; V.+5; A. 15; C. 15.

Second dorsal ray longest; 25 dorsal spines; caudal fin, a little forked; lateral line spinous. Thence to D. fin, and to about an equal distance below the line, rough with spinous scales (this is not mentioned by Cuv. and Val.); lower portion of sides smooth.

With the *T. aspera*, Viviana, as described in the last-quoted work, t. iv. p. 77, and which in length is stated like the *Tri. pœciloptera* to be about 4 inches, the present specimen agrees in many respects, but chiefly differs in the profile being less vertical, in the anterior lobes of the snout, and in the negative character of wanting 'une échancrure transversale et profonde,' behind the posterior orbital spine; nor with the highest power of a lens can any of the anterior dorsal spines be distinguished as 'dentelée,' nor the first and second rays of the D. fin as serrated, both of which characters are attributed to *T. aspera*.

In the course of this examination, specimens of *T. Cuculus*, Bl., *T. lineata*, *T. Hirundo*, *T. Pini*, Bl., and *T. Gurnardus*, were before me. *T. Lyra* was not available; but the remarkable development of the anterior lobes of the snout in this species would have rendered its comparison with the specimen under consideration unnecessary.

The *T. pœciloptera* has previously been obtained only at Dieppe, where it was discovered by M. Valenciennes."

Mr. Yarrell, in his Hist. of Brit. Fishes, vol. i. p. 49, after referring to the above specimens, says:—

"M. Valenciennes, at my request, very kindly sent me over a beautiful coloured drawing of this species, and comparing this representation with the small specimen from Youghal which had been intrusted to me, I am also induced to consider it identical, and have accordingly given this species a place among British Fishes."

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* Since the above was written I have had an opportunity of comparing the *Trigla* here treated of with two specimens of *T. aspera*—one 3½, the other 4½, inches long, which are part of a collection of fishes sent last year from Corfu to the Belfast Natural History Society, by Robert Templeton, Esq., Royal Art. This comparison served strongly to confirm everything above stated. The *T. aspera* is admirably described by Cuv. and Val.

THE RIVER BULL-HEAD, OR MILLER'S THUMB, *Cottus Gobio*, Linn.,

Is not, so far as I am aware, found in Ireland.

The species has, however, been recorded here, as appears by the following extracts:—

"*Gobius Scorpius*, Father-lasher, not common."

"*Gobius Gobio*, Miller's Thumb, rather more abundant."—*Sampson's Derry*, p. 337.

"*Cottus Gobio*, Miller's Thumb, Bull-head, caught on the shore about the rocks at low water; it frequents the mouths of fresh waters, and varies in length from 4 to 10 inches—not eaten."

"*Cottus Scorpius*, Father-lasher.—This fish resembles the last and is often confounded with it: both are said to be poisonous. Their disagreeable figures perhaps gave rise to the report of their bad qualities."—*M'Skimmin's Carrickfergus*, p. 359 (3rd Ed.).

There is nothing poisonous in these fishes, as there really is in the Weever; but they are both willing and able to wound with their spines.

"*Cottus Gobio*, Bull-head," is included in Dr. P. Browne's list.

Yarrell, perhaps from the information supplied to him from these works, sets down the River Bull-head, *Cottus Gobio*, as found at Belfast and Londonderry (Brit. Fishes, p. 71).

THE SEA SCORPION,* *Cottus Scorpius*, Bloch,

Is found from North to South, and apparently around the coast, during the year.

Contents of stomachs examined:—Several crustacea (*Gammaridæ*); a full-grown shrimp, and other crustacea; crustacea, among which were a shrimp and many *Idotea;* the remains of a small flat-fish—a sole, apparently—and a crab so large that it must have filled a fish's gape; the remains of fish.

Specimens which I have seen (dredged from deep and pure sea-water, in Strangford Lough, and on Antrim coasts) were much larger than Yarrell mentions in reference to the British Islands. He speaks of them "from 4 or 5 to 8 inches." On referring to notes made on a few specimens taken in Belfast Bay, far up the estuary, three of them were from 10 to 11 inches in length: two of these are preserved in the Belfast Museum.

Dr. J. L. Drummond called my attention to the liver of this species being bright orange, and stated that that of the *C. Bubalis* is of the same bright colour.

On 29th March, 1838, I received a female *C. Scorpius* (taken in Belfast Bay) which had four spines on one pre-opercle; on the other it had three, the usual number. An extremely beautiful specimen, 4½ inches long, taken in the same locality, was brought to me on 20th February, 1845; for one-half of its length, anteriorly, the under parts were of a rich rosy red colour, with numerous snowy white spots, all perfectly circular. I sent it to the Belfast Museum, to be preserved in spirits.

Cottus Scorpius received and examined, December, 1835, had the fin-rays as follow:—D. 11—15; P. 15 on one side, 16 on other—both perfect; V. 1 | 3; A. 12; C. 11; with more short ones than *C. Bubalis* examined same day pre-opercle; 3 spines.

Templeton remarks:—"They are very wary, permitting the hand to ap—

* This species, as well as the next, is called "Miller's Thumb" in the North of Ireland.

proach them within a couple of inches, before they quit their station on the rock, but then darting away with inconceivable velocity."

THE FATHER-LASHER, OR LONG-SPINED COTTUS,* *Cottus bubalis*, Euph.,

Is found around the coast throughout the year.

In a brief notice of this species which I contributed to the Zool. Proc., 1835, p. 80, it was mentioned that of 11 specimens of *C. bubalis* and *C. Scorpius* examined by me, which were obtained in the North-East, the West, and the South of Ireland, and preserved without any regard to species, eight were of the former and three of the latter. My subsequent observations tend to confirm the opinion that *C. bubalis* is more common than *C. Scorpius* on the coast of Ireland.

Mr. Yarrell attributes to this sp.—*C. bubalis*—on the English shores, a greater length ("6 to 10 inches") than *C. Scorpius*; but the great numbers of Irish specimens which have come under my examination, indicate that here it is a very decidedly smaller sp.

None of the numerous specimens which I have obtained along the coasts of Antrim and Down exceeded 7 inches in length.

This sp. seems to be rather more of a marine fish than *C. Scorp.*; the largest specimens of the latter which I have seen were from brackish water, though I have taken it in the purest sea-water also.

C. bubalis was generally procured in rock-pools (in bays, and on the open coast), accessible at low water. One specimen was captured with atherines.

This sp. was probably one of the two alluded to in the Histories of Derry and Carrickfergus, noticed under *C. gobio*.

Donovan's fig. of *C. Scorpius* represents *C. bubalis*:—Yarrell quotes it as such; but Jenyns gives it as *C. Scorp.*

Fin-rays of *Cottus bubalis* received and examined, Dec. 1835: D. 9—12; P. 15; V. 1|3; A. 10; C. 11; well developed, and some short; pre-opercle 4 spines.

It may here be mentioned that, in August, 1841, I procured a *C. bubalis* in Freshwater Bay, Isle of Wight.

THE GREENLAND BULL-HEAD, *Cottus Grœnlandicus*, Cuv. and Val.

A specimen of this fish which was captured in Dingle Harbour, in February, 1850, came into the possession of Mr. Wm. Andrews, of Dublin, who observed its specific characters, and apprized me of the circumstance, by letter dated 22nd February, 1850. He exhibited the specimen at the meeting of the Dublin Nat. Hist. Society, held on the 1st of the following month; and a description of it will be found in that Society's proceedings. Dr. Ball informs me that he had some years previously procured at Dublin an example of the same species, which is now in the University Museum, but that he had not ascertained the specific distinctions until Mr. Andrews announced his specimen.

The *Cottus Grœnlandicus* had been previously recorded as an Irish species; but I have little doubt that *C. bubalis* was the fish referred to.†

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* This species, as well as the last, is called "Miller's Thumb" in the North of Ireland.

† *Cottus Grœnlandicus* is not rare in Dublin Bay. A *Cottus* captured by Dr. Corrigan had four strong tubercles on the head—*Cottus quadricornis?*—*R. Ball.*

THE ARMED BULL-HEAD OR POGGE, *Aspidophorus cataphractus*, Jen.,

Is found around the coast, and is a common fish.

The largest specimen taken by the Ordnance Collectors is said to have been 6 inches long, which is a very large size for the species to attain—at least on our northern coast.

It is a deep-sea fish, and is most frequently captured in the dredge; I have occasionally found it along with other fishes, in the stomachs of cod. "Taken abundantly above the Pigeon House in the Liffey."—*Dr. Ball.*

Templeton had only seen one specimen, which may be accounted for by the fact, that that naturalist was not in the habit of using the dredge or trawl.

THE BERGYLT OR NORWAY HADDOCK, *Sebastes Norvegicus*, Linn.

Mr. W. Andrews obtained several specimens of the Norway haddock off Dingle Bay, a few years ago, as recorded in the proceedings of the Dublin Nat. Hist. Society. I am not aware that this fish had been previously observed upon our coasts.

THE THREE-SPINED STICKLEBACK,* *Gasterosteus aculeatus*, Linn.,

Is common from North to South.

In the Annals of Nat. Hist. for April, 1841, I published the following observations on the several species of stickleback (*Gasterosteus*, Linn.) found in Ireland:—

In the Histoire des Poissons of Cuvier and Valenciennes, the *Gasterosteus aculeatus* of Linnæus is divided into several species. The views there adopted are followed in Great Britain † by Mr. Yarrell and Dr. Parnell in their respective works; but in Mr. Jenyns's Manual four of these species—all that have been recognised as British—are, after a close comparison of examples from the same pond, and of these again with others from different waters, reduced to one species.‡ Having myself compared specimens of the fish in question from still more numerous localities than the last-named author, I arrive at the same conclusion in so far as it extends; but go still further and venture to consider six or seven of the species of the Hist. des Poiss. as in reality but one, assuming so many different appearances. To allude to the extreme accuracy of description characteristic of that truly great work—the Hist. des Poiss.—would be most superfluous. On another point altogether the different view adopted in the present paper turns—namely, on the *permanency of characters* there attributed to the 3-spined *Gasterosteus*.

In this genus, Ireland possesses all the forms which are included in the British catalogue. An additional one—*G. semiloricatus*, Cuv. and

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* Vulgarly called Spricklebag in the North of Ireland, Thornback at Killalo, and Pinkeen in some localities.

† Nilsson, in his Prodromus Ichthyologiæ Scandinavicæ, published in 1832, thus describes varieties of *Gast. aculeatus*, Linn.:—

"*a.* Capite, a latere inspecto, magis acuto; spinis dorsalibus longioribus, media longitudinem capitis dimidiam æquante et dimidiam corporis altitudinem superante.

"*β.* Capite, a latere inspecto, magis obtuso; spinis dorsalibus brevioribus; media multo breviore quam ⅓ capitis et dimid. corpor. altit."—p. 86.

This author makes *G. trachurus* synonymous with *G. aculeatus*, Linn.; he does not offer any opinion on the species of *Gasterosteus* in the Hist. des Poiss.

‡ In a note to p. 350, Mr. Jenyns observes with reference to *G. brachycentrus*, that "it is more than probable that some of the other foreign *Gasterostei* described by Cuvier are mere varieties of this species"—*G. aculeatus*, Linn.

Val.—will be particularly treated of, and come first under notice, as one of the two varieties which are protected with scaly plates throughout the sides.

G. trachurus, Cuv. and Val., t. iv. p. 481.

G. semiloricatus, Cuv. and Val., t. iv. p. 494.

March 20, 1835.—On examination of a number of 3-spined Sticklebacks from the island of Rathlin (sent by Mrs. Gage to Dr. J. D. Marshall, who submitted them to my inspection), I find that in some the lateral plates extend through the entire sides, as in *G. trachurus*; in others, so far only as in *G. semiarmatus*; and in some again no further than in *G. leiurus*. No other difference can be perceived in these specimens, which are all of a small size, from an inch to an inch and a half in length. From between tide-marks in Larne Lough (Mrs. Patterson); from oozy and rocky pools over which the tide regularly flows, situated near the edge of Belfast Bay (Richard Langtry, Esq.—W. T.); also from a deep pool in the middle of it (Mr. James Nichol); and from the harbour of Donaghadee (Capt. Fayrer, R. N.),—I possess examples of the full-armed stickleback of various sizes up to 3 inches.

In addition to these Irish examples of the full-armed stickleback, some 2 inches in length from the Thames, communicated in 1834 by Mr. Yarrell, are before me for comparison, and several from 1¼ to 1¾ inch, which I obtained in a marine rock-pool at Ballantrae, Ayrshire, in August, 1839.

In June, 1836, Lieut. Davis, R. N., sent to the Belfast Museum, from the neighbourhood of Donaghadee, some gigantic specimens, two of which are 3¼ inches in length, and 10 lines in depth; a third is 3 inches 4 lines long and 9 lines deep; the number of fin-rays is the same in all, viz:—

D. III + 12; A. I + 9; P. 10; V. I + 1; C. 12.

These three individuals have each 23 plates on the side of the body to the origin of the caudal keel, and thus agree with the *G. semiloricatus*. Colour as usual in female specimens, no red appearing anywhere. With the above were two others of ordinary size; one of which was red on the lower portion of the body. Lieut. Davis stated in a note respecting them, that they "were found in a pool of brackish water accessible to the sea, at the Foreland rocks near Donaghadee." The example, 2½ inches in length, from deep water in Belfast Bay, differs very much from the large individuals just noticed, in the free margins of the lateral plates; these in the latter are finely, regularly, and very minutely serrated, while in the former they are distinctly toothed, the denticles becoming larger on the plates as these latter approach the tail. The number of these plates to the origin of the caudal keel is about 23, as in the large examples; this number likewise appears in the Thames specimen of *G. trachurus*. With the exception of a ray less in the anal fin, the number of fin-rays is the same in that under consideration as in the large fish. The example, 2 inches in length, from Donaghadee harbour, has likewise about 23 plates on the side to the origin of the caudal keel: the serration on the free margin of these plates is intermediate between that exhibited in the specimens from the Foreland Point and the one just noticed from Belfast Bay.

In the full-armed sticklebacks from the localities generally, which have been enumerated, great differences are observable, as—considering for the present adult fish only—in the comparative length of the dorsal and

ventral spines, and in the lateral plates. In some individuals these do not occupy more than the central portion of the sides, in others the whole sides, and again are intermediate.

In the absence either of a specimen for comparison, or a figure to refer to, it may perhaps be considered that certainty cannot be arrived at respecting *G. semiloricatus*. This fish is stated to differ from *G. trachurus* in having only 22 or 23 plates on each side to the origin of the caudal keel instead of its 25 or 26, and in the shoulder-plate (plaque de l'épaule) being larger. It has been seen that some of my specimens, and of these some of the largest size, possess only the number of lateral plates attributed to *G. semiloricatus*. In examples of equal length, and from the same as well as from different localities, I find the size of the shoulder-plate to vary like other characters. Hence I am disposed to regard some of the examples under consideration as this fish.

In the Hist. des Poiss. it is remarked of *G. semiloricatus*, "Nous n'avons pu trouver aux environs de Paris que des épinoches à queue nue; il nous en est venu de pareilles des départemens de la Somme et de l'Oise, de la Rochelle et de quelques autres lieux: nous avons observé celle à queue cuirassée dans les ruisseaux des côtes de Normandie, et encore récemment M. Deslongchamps nous l'a envoyée de Caen, et M. Baillon en a pris dans le Hable-d'Ault, lac saumâtre de l'embouchure de la Somme, près du Tréport. C'est la seule qui se trouve dans les étangs des environs de Berlin, et elle y est en quantité innombrable. Peut-être est-ce l'espèce qui habite plus fréquemment près des bords de la mer, et qui peut entrer dans l'eau salée. Des observations ultérieures nous apprendront sans doute bientôt ce qui en est."—t. iv. p. 494.

This accords generally with my own observation, as in seven out of the nine localities whence my specimens mailed throughout the sides were derived—whether they be called *G. trachurus* or *G. semiloricatus*—they were taken either in the sea or estuary. The exceptions are the largest specimens, which were procured in a "pool of brackish water accessible to the sea;" and those from Rathlin, obtained in fresh water. From the passage just quoted, we learn that the *G. semiloricatus* inhabits the pools about Berlin. It has always seemed to me not improbable, that in the sea, where the enemies of this diminutive fish are more numerous than in the fresh water, the protecting hand of Nature had as a defence armed its body with these lateral plates. That some fishes have the power of accommodating their colour to that of the ground or bottom of the water they frequent, and are thus rendered comparatively inconspicuous to their enemies, is well established.

A third species of 3-spined stickleback, armed throughout the sides like those here treated of, is the *G. Noveboracensis*, which, as its name denotes, is found at New York. Judging from the description and figure of this fish in the Hist. des Poiss., I should not consider it distinct from *G. trachurus* or *G. semiloricatus*. The specimens which have come under my examination differ much in the few characters which are said to distinguish this fish from *G. trachurus*. The high position of the lateral line is the chief character of *G. Noveboracensis*: in some specimens before me this line is so near the back that three-fourths of the body of the fish are below it. Our *G. Pungitius* is admitted as an American species by Dr. Storer in his interesting work on the Fishes, &c., of Massachusetts (p. 32), and for a copy of which I am indebted to his kindness.

The descriptions and figure of the *G. obolarius*, Cuv. and Val.—a 3-spined stickleback armed throughout the sides, and found in the North Pacific Ocean and the Gulf of Kamtschatka—are said in the Hist. des

Poiss. to be insufficient to mark it with certainty as a species distinct from the full-armed *Gasterosteus* of Europe or America (p. 500).

Dr. Parnell, in his Fishes of the Frith of Forth (p. 34), after stating that he agrees with Cuvier and Yarrell in considering the *G. trachurus* as "a constant and well-marked species," observes that the "square tail" does not exist in the other sticklebacks. According to my observation, it is certainly less developed in them, and generally (but not invariably) corresponds with the protecting side-plates, presenting a greater or less development accordingly as the armature of the body is of a heavier or lighter cast. Dr. Parnell further remarks, as corroborative of *G. trachurus* being a distinct species, that he has "examined carefully several hundred from half an inch to two inches and a half in length, and in all the specimens the lateral plates were constant." In particular localities I have met with the same result on examining specimens of all sizes of *G. trachurus* and of the other varieties also,* but in some places again the different varieties are found together and of every size.† Mr. Yarrell has so noticed three of them in the Thames at Woolwich; and in Rathlin, as before mentioned, they occur together—in the former locality in brackish, in the latter in fresh, water.

G. semiarmatus, Cuv. and Val., t. iv. p. 493, appears to be the rarest of the 3-spined sticklebacks in Ireland. I possess specimens from the island of Rathlin, as before mentioned, and from Wolfhill, in the neighbourhood of Belfast. One example only occurred in the latter locality, where it was taken in 1832 with a number of *G. brachycentrus*, the stickleback of that district; it is, indeed, this variety in every respect, except in having the lateral plates extending along the sides so far as in *G. semiarmatus*: the other characters assigned to this supposed species in the Hist. des Poiss. are very variable. From the half-armed species I turn to the

G. leiurus, Cuv. and Val., t. iv. p. 487, in which the lateral plates do not extend beyond the pectorial region. In every respect but this it is considered in the Hist. des Poiss. so similar to *G. trachurus*, that the one description is given as equally applicable to both. The *G. leiurus* would seem to be the most common *freshwater* stickleback in Ireland.‡

The localities whence specimens of this fish are now before me, are—the island of Rathlin;—the neighbourhood of Belfast (W. T.);—River Bann at Toome (W. T.); Portaferry and Newcastle, County Down (W. T.);—Lough Melvin, County Fermanagh (W. T.);—neighbourhood of Dublin (Dr. Ball);—Glendalough, County Wicklow (Mr. G. C. Hyndman);—Portarlington, Queen's County (Rev. B. J. Clarke);—some of the examples from this locality are very handsomely marked, being along the back of a rich

* The partial exception to this is in *G. brachycentrus*, in which the dorsal spines are comparatively longer in young than in adult individuals, and hence the young in this respect accord with *G. leiurus*. I here speak of localities in which all the full-grown fish are *G. brachycentrus*.

† From the many small examples of all the varieties about nine lines in length that have come under my observation, I should think the number of lateral plates they are to possess through life is then as decided as the number of fin-rays; *i. e.* provided they would have remained in the locality whence they were taken. Whether such a change of habitation, as from fresh water to the sea, would cause the smooth-sided at any age to put on the lateral armour may remain a question.

‡ From drains which are occasionally replenished by the tide I have also taken it.

brown colour, which is continued down the sides in the form of regular transverse bands upon a yellow ground;—River Shannon, at Killaloe (Rev. C. Mayne);—Youghal, County Cork (Dr. Ball).

From Scotland I have specimens obtained in the neighbourhood of Portpatrick by Capt. Fayrer, R. N. Examples from the Thames have been favoured me by Mr. Yarrell; and in the river Leam, at Leamington, Warwickshire, the *G. leiurus* has occurred to myself. Next to this variety naturally comes the

G. brachycentrus, Cuv. and Val., t. iv. p. 499, which, like it, is smooth along the sides from the pectoral region, but differs in the shortness of the dorsal and ventral spines. From the comparative length of these spines alone do I distinguish the two varieties, the other characters attributed to *G. brachycentrus* being ever varying. The Irish localities whence I have this fish are the neighbourhood of Belfast, and pools along the margin of Lough Neagh (W. T.), Dublin, Youghal, and Portarlington—supplied from these three localities by the friends before mentioned.

The largest example which has come under my observation was one taken by myself in England, at Stow Pool, Lichfield, in July, 1836, and which was noticed in the Proceedings of the Zoological Society for the next year. This is the only allusion I have seen to the *G. brachycentrus* in Great Britain.

This variety, which from the shortness of its spines is the most defenceless of the 3-spined sticklebacks, we should, *à priori*,—*i. e.* if the suggestion respecting the full-armed variety be correct,—expect to find where it has fewest enemies, and such, according to my very limited observation, is the case. This would seem to be the variety more peculiar to still water, in which it often attains a very large size. The only continental notice of this fish known to me is that in the Hist. des Poiss., where it is stated to have been obtained by M. Savigny in the brooks of Tuscany.

The following comparison between *G. brachycentrus* from the neighbourhood of Belfast, and specimens of *G. leiurus*, &c., from the Thames, with which I have been favoured by Mr. Yarrell, was drawn up early in 1834, and read before the Linnæan Society that year.*

In the form of outline the Irish fish generally differs much from the *G. leiurus*, the latter being from the centre of the back alike gracefully sloped on either side to the head and tail, giving that part a handsome and finely-arched appearance: the under side of the body also exhibits more of this form than that of its congener. The back of the Irish species, instead of thus sloping gradually to the centre, is at that part rather flat, and is at least as high where the dorsal fin originates as elsewhere. The Irish fish is in proportion to its depth longer than the *G. leiurus*, as specimens of the latter under 2¼ inches in length, when compared with Irish specimens 3 inches long, proved of equal dimensions (8 lines) at the deepest part. The difference is also strongly marked in the relative breadth of the two species, the Irish maintaining considerable breadth throughout, even to the origin of the caudal fin. The *teeth* in the lower jaw of the Irish species consist in the centre of about four rows irregularly disposed, but become gradually less numerous towards the back of the mouth, where they terminate in a single line: the upper jaw contains three rows in front, the outer and inner being regular in distribution. In number, the *G. leiurus* which I examined does not possess so many teeth as that species, but in their arrangement there is little difference. On

* Phil. Mag. vol. v. 299 (1834).

reckoning the *vertebræ* in a specimen of the *G. leiurus* and in one of the Irish sticklebacks of a similar length, I find that the number in the latter exceeds that in the former species, and that they are throughout more regularly equidistant than in the *G. leiurus*.

In the three English sticklebacks, *G. trachurus*, *G. semiarmatus*, and *G. leiurus*, the bony plate covering the head is much stronger than in the Irish fish—the outline of the lower jaw more angular—the lips smaller and less fleshy—the number of rays in the fins different, consisting generally, in the Irish specimens, of twelve in the dorsal, ten in the pectoral, eight in the anal, and twelve in the caudal. In the three English *Gasterostei*, also, the ventral spine is longer, but not so broad as in the Irish fish—the dorsal spines considerably longer, and the plates whence they spring proportionately larger. The following is the measurement of the spines in the four species:—

	Total length of fish.	First dorsal spine.	Second.	Ventral.
G. trachurus	2 in. 1½ lin.	2¼ lin.	2¾ lin.	4 lin.
G. semiarmatus	2 6	2½	3	4½
G. leiurus	2 6	2⅝	3	4½
Irish species, G. brachycentrus	3 0	1½	1¾	3¼

In the last species * the membrane extends to the extremities of all the spines.

About Belfast I have taken the smooth-sided sticklebacks—*G. leiurus* and *G. brachycentrus*—from ditches in the low grounds, from clear mountain-streams at an elevation of 600 feet above the level of the sea, from the muddy rivers Blackwater and Lagan, and from water which was partially salt (here *G. leiurus* only), when, contrary to what might be expected, the largest were invariably found where the temperature was lowest, specimens there (*G. brachycentrus*) not uncommonly attaining the length of three inches, and perfectly free from the pearl-like tumours, which, adhering to the body, infest those inhabiting the comparatively warm waters of the lower grounds. This short-spined stickleback here exhibits, in all respects, the same colours as the most common of the English varieties; of many of the larger individuals captured in the month of September, about the one-half were red on the under parts. In large shoals, too, I have remarked fully this proportion to have assumed the scarlet, and in the early summer months I have observed that full-grown fishes, in which the most intense shade of this colour prevailed, never appear to be with spawn,† very few in that state being so much as faintly tinged with it. This *Gasterosteus* and the trout (*Salmo Fario*) seem not to co-exist in some of our smaller rivers, or do so very partially. In the stream whence the largest of these were taken, trout (*Salmo Fario*) were a dozen years ago very common, and the stickleback unknown, and it is only since the almost total disappearance of the trout that this fish has been established in its waters. In a similar stream, issuing from the same mountain-range, at about four miles distance, the trout yet main-

* Agreeably to the view taken in the Hist. des Poiss., the term "species" was here applied to *G. brachycentrus*. I was disposed at the time (1834) to regard it as a local variety, but had not the means, which have since been afforded by a comparison of specimens from numerous localities, to arrive at a certain conclusion on the subject.

† So late as the 19th Sept., 1832, I remarked one large with spawn.

tains its place, and in the parts of the river frequented by it I have in vain looked for the stickleback.

The figure of *G. brachycentrus* in the Hist. des Poiss. resembles the Irish fish when in spawn, and not its usual appearance.

In addition to that fish, there is another 3-spined stickleback, brought by M. Savigny from the brooks of Tuscany, described as new in the Hist. des Poiss.—from its brilliant operculum, it is named *G. argyropomus*. In this and the other characters assigned to it, Irish specimens in my possession fully accord. It is suggested, indeed, with reference to the characters attributed to this and the two other *Gasterostei*—*G. brachycentrus* and *G. tetracanthus*—brought by M. Savigny from Tuscany—"Nous allons les indiquer, pour engager les observateurs à s'assurer de leur constance," p. 498. In the next page it is, however, remarked of *G. brachycentrus*, that there is no doubt of its being a true species.*

FOUR-SPINED STICKLEBACK, *G. spinulosus*, Yarr. and Jenyns.

Among specimens of *Gasterostei* kindly procured for me at La Bergerie, near Portarlington, Queen's County, by the Rev. B. J. Clarke, is an individual with four spines. It is $1\frac{1}{4}$ inch long; the first and second spines are of ordinary length; the third spine is short, but exceeding the fourth. In no other character than that of having four spines does this fish differ from the 3-spined examples taken with it, and consequently I cannot look upon it otherwise than merely an accidental variety of *G. aculeatus*, Linn. It was among a parcel consisting of *G. leiurus*, *G. brachycentrus*, and *G. Pungitius*, taken in a pond and in some neighbouring drains. The "ascending plate from the base of the ventrals" (see Jenyns's Manual, p. 350) I find subject to variety of form like other parts.

That the fish under consideration is the *G. spinulosus* seems to me not to admit of doubt.†

This stickleback is very bold and voracious, and will attack any living object it can master: in illustration of this, I may mention that, in August, 1844, a small party of these fishes were observed near Belfast, in the act of killing a horse-leech, the head of which they immediately devoured.

In Nov., 1851, a specimen of the 3-spined stickleback was taken from the stomach of a Redbreasted Merganser (*Mergus serrator*) shot in Belfast Bay.

At the end of May, and during June, I have remarked the spawn just ready for exclusion, in examples taken about Belfast.

The following is an extract from a letter, dated at Innistioge, 13th Aug., '46, which I received from Professor Allman:—

"I have been looking a little to the *sticklebacks* which I happened to meet with in my rambles, and find that throughout a great part of Tipperary, Queen's Co., and Kilkenny, the *Gast. leiurus* is the predominant species. I have not once found *G. trachurus* nor *semiarmatus*. I have

* The different varieties of the 3-spined stickleback are commonly known in the North of Ireland by the name of spricklebag, evidently a corruption of the proper term; Pinkeen is applied to them in the South; and from the Shannon they have been sent to me under the name of Thornback.

† "Since the above was written, I have been gratified to find that my friend Dr. Johnston, in a List of the Fishes of Berwickshire, exclusive of the 'Salmones,' considers the *G. spinulosus* a variety only of the 3-spined species—of these he notices the 'Rough-tailed, Half-armed, and Smooth-tailed Sticklebacks' of Yarrell, as varieties only of one species. (See Report of the Berwickshire Naturalists' Club for 1838, p. 171.)"

not very uncommonly seen a stickleback in every way resembling *G. leiurus*, but with a fourth spine developed between the last and penultimate dorsal: I cannot, however, believe it more than a variety of *leiurus*.

"In one locality I obtained several specimens of a stickleback with 7 to 9 dorsal spines, apparently referrible to *Pungitius*; but what I am chiefly desirous to ask you about is the existence of a species closely resembling the last, but *without any traces* of *ventral spines*.

"Of this I have taken in one locality several specimens."

THE TEN-SPINED STICKLEBACK, *Gasterosteus Pungitius*, Linn.

This diminutive fish is "rare" in Ireland, comparatively with the 3-spined species, as has already been noticed by Templeton.* The localities whence I possess it are very few in number, viz.—pits excavated in brick-making on the banks of the Blackstaff river, near Belfast; a marsh in the neighbourhood of Portaferry, County Down (W. T.); and La Bergerie, Queen's County (Rev. B. J. Clarke); from this locality a considerable number were sent, and among them the largest native specimens I have seen, a few being 1⅜ inch in length, and one having attained to 2¼ inches. Dr. Ball informs me that it inhabits the ponds at Glassnevin, Dublin, and that he has procured examples near Youghal.

From the neighbourhood of Portpatrick, Scotland, this species has been sent me by Capt. Fayrer, R. N. For examples from the Thames I am indebted to Mr. Yarrell; and in the river Leam, near Leamington, Warwickshire, it has occurred to myself.

In most of the above localities the 3-spined species was taken with the *G. Pungitius*. All of the latter, whether from brackish or fresh water, are smooth throughout the sides (*G. lævis*, Cuv. Règne Animal, 2nd ed.†), and but a very few individuals present any appearance of a keel on the sides of the tail. The dorsal spines vary from nine to eleven in number, and do so in examples of equal size from the same place.

Mr. Jenyns, in his Manual, says of this species, that it is "equally abundant with the *G. aculeatus*, and as generally distributed."

This observation is not applicable to Ireland.

THE FIFTEEN-SPINED STICKLEBACK,‡ *Gasterosteus Spinachia*, Linn.

This species, differing from *G. aculeatus* and *G. Pungitius* in being strictly a marine fish, is found around the coast of Ireland. I possess examples obtained at Rathlin in the North (by Dr. J. D. Marshall); on the coasts of Down (W. T.) and Antrim (by Mrs. Patterson) in the North-East; Bundoran in the West (W. T.); and Youghal in the South (by Dr. Ball). §

On the southern coast, where sprat-fishing is regularly practised, the *G. Spinachia* is taken in greater quantity than in the North. Dr. Ball on one occasion knew as many to be captured with the sprat (*Clupea Sprattus*), at Youghal, as would "fill a bushel," and at Glendore and the South-West coast of Cork generally Dr. Allmanin forms me that it is often taken at the same time with this fish. On the coast of Down full-grown specimens have occasionally occurred to me when dredging, and likewise under stones between tide-marks, and one or two individuals may sometimes be

* Mag. Nat. Hist. vol. i. New Series.

† See also Hist. des Poiss. t. iv. p. 507.

‡ Horn-eel is a common name for this species in the North; it is called Horn-fish in Belfast market.

§ Recently obtainable in quantity in mouth of the river Liffey.—*R. Ball.*

seen in the fish-market at Belfast, whither they are brought with quantities of the atherine (*Atherina Presbyter*) from Portaferry, in the winter and early spring. In the rock-pools, on different parts of the coast, the margins of which are accessible at low water, the fry of *G. Spinachia* may be observed in the month of June about three-quarters of an inch in length;* and in such places I have at Bangor (County Down), in the middle of September, captured them of twice that size, where in winter neither young nor adult examples ever occurred to me: the species is on our coast throughout the year.

Both the *G. aculeatus* and *G. Pungitius* were included in Dr. Patrick Brown's Catalogue; the former species was noticed two years before by Rutty. In M'Skimmin's History of Carrickfergus, and in Mr. Templeton's Catalogue, the *G. Spinachia* has a place.

In one respect the foregoing pages [on the *Gasterostei*] may be considered rather as exhibiting a retrogression than an advancement of the subject, as in them an attempt is made to restore what have latterly been considered as several species simply into the three described by Linnæus as *Gast. aculeatus*, *G. Pungitius*, and *G. Spinachia*.

"The 15-*spined stickleback* is abundant on the southern coast and in Dublin Bay. It possesses the chameleon-like quality of changing colour when excited."—*Dr. Ball.*

This peculiarity is noticed by Mr. Couch (see Yarrell, p. 103), and Dr. Stark mentions the change of colour in the 4-spined stickleback. (See Yarrell, p. 98.)

THE MAIGRE, *Sciæna Aquila*, Cuv. and Val.,

Has been once taken on the coast, as mentioned in the following note which I extract from The Cork Fauna, by Dr. Harvey:—

"A fine specimen of this fish, the first which has been recorded as having occurred on the Irish coast, was taken while basking at the surface of the water opposite passage in the harbour of Cork, on the 1st August, 1840. It measured 6 feet 4 inches. The skin and auricular bones were preserved, and are in my possession, but its large and beautifully-fringed air-bladder was unfortunately burst in attempting to free its numerous processes from their attachments between the vertebræ."

Dr. Harvey, in a letter which I received from him relative to this fish, remarked that "it was seen lying on the top of the water by some fishermen, who managed to haul it into their boats; it was apparently in good health—the flesh very firm."

Specimens of the maigre are occasionally taken on the British coast; *The Times* of 4th November, 1850, thus noticed one:

"An enormous fish weighing upwards of 100 lbs. called the Maigre (*sciæna aquila*) was caught during the last week off Brixham roads by some fishermen of that port, and sent by railway to Billingsgate market on Saturday morning."

Family SPARIDÆ.

THE SPANISH SEA-BREAM, *Pagellus erythrinus*, Cuv. and Val.,

Has been obtained on the South-West coast by Mr. William Andrews. See proceedings of the Dublin Nat. Hist. Society.

THE COMMON SEA-BREAM,† *Pagellus centrodontus*, Cuv. and Val.,

Is common around the coast.

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* In July (1840) I took them an inch long on the coast of Galway.

† Called "Brazier" in the North, "Carf," "Carp," or "Sea-Bream," in the North-East, and "Gunner" in the West.

It is, I presume, this species which is alluded to by Templeton, under the name of *Sparus auratus*, Linn.

Although procured in abundance, with other fish, on the North-East coast, the sea-bream is considered scarcely worth bringing to Belfast market, where more than a very few are seldom seen together; but, in every month in the year I have observed full-grown specimens here; they are, however, chiefly taken in Autumn. They attain from 3 to 5 or 6 lbs. weight.

The stomach of a specimen which I examined on 12th August, 1836, contains an *ascidia-like* animal, and fragments of mature specimens of the *Ophiura rosula*.

This fish is frequently captured with haddock, the baits generally used being the lug-worm, shell-fish (mussels, &c.), and herring fry.

Maxwell gives the following note in his Wild Sports of the West:—*

"The *Gunner* is the common name given to the sea-bream by the fishermen on the western coast. They are found near the shore, in from 5 to 15 fathom water, where the bottom is foul and rocky. The gunners are pretty but insipid fish, and, in variety of colour, differ from each other more than any species of the finny tribe I have met with. In size they seldom exceed 3 or 4 pounds; but, from the avidity with which they bite, they afford excellent amusement when the breeze is not sufficiently stiff to allow a take of mackerel and coal-fish. The bait generally used for gunners is a small crab, broken and bound about the hook with a thread; and 2 hooks affixed to a trap-stick, with a light leaden plummet, comprise the simple apparatus requisite for this kind of sea-fishing."

Aug. 15th, 1851. I saw two fine fish of this species at the Rev. G. M. Black's, at Annalong (Co. Down), on which coast this fish is highly prized for food. The species is common here; 64 were lately taken in the course of a night's fishing in a small boat.

Aug. 23rd. During last night's fishing of a small boat, I learn from Mr. Black that 120 were taken. A slice of mackerel is the chief bait now used for them.

Sept. 25th. We had one of these fish for dinner, and thought it very good. It was baked with stuffing like that used for a turkey.

A specimen of this fish, in the Belfast Museum, is 18 inches in length, D. 12|12; P. 16; V. 1|5; A. 3 soft rays imperfect; C. 17, reckoning two longest and those intermediate. Another specimen, in the same collection, is as follows:—Length, 19 inches, D. 12+12; P. 17; V. 1+5; A. 3+12; C. 17 (1 à la Cuv.).

THE BLACK SEA-BREAM, *Cantharus lineatus*, Mont. (sp.), *Cantharus griseus*, Cuv. and Val.

To Dr. J. L. Drummond we are indebted for the addition of this species to our fauna. On the 18th of May, 1846, he obtained a fine specimen, which was taken on a hand-line with lug-worm (*Arenicola piscatorum*, Lam.) as bait, on "foul ground" at Cultra Point, Belfast Bay. My friend drew up an ample description (zoological and anatomical) of the specimen, which he carefully preserved and kindly sent to me. I make the following selection from his notes:—

"Length from snout to middle of caudal fin 16 inches; breadth at shoulder 6½ inches; weight 3 lbs.

"D. 10+11; P. 10 (the fifth longest); V. 1+5; A. 1+11; C. 17. Branch. 5.

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* Dr. Ball thinks it applies to the Wrasse rather than to this species.

"D. fin, almost black in colour, rises from a deep groove in the back.

"Whole fish of a dark leaden hue; lateral line very conspicuous, black, broad, and of similar breadth throughout—less than one-third the depth of the fish from the back; upper lobe of C. fin longer than the lower; eyes large, yellowish, irides dark brown; scales large, firmly imbedded in the skin, transparent; the colour of the black lines is in the skin itself, and is seen through the transparent scale.

"Cæca wide, about 1¼ inch long, their walls very thin, as were those of the stomach; both nearly transparent; swimming-bladder large and silvery.

"Intestine, except at lower end, very thin, rather long, very wide, and containing large masses of vegetable matter, which, in the microscope, seemed to be chiefly *Ceramium rubrum* and *Rhodomela subfusca* deprived of their parenchyma, but their walls remaining entire and transparent. In the lower part of the intestine was the operculum apparently of a whelk (*Buccinum undatum*), with the firm muscular white part of the animal firmly attached to it, and unaffected by the digestive process, showing probably that vegetable food is that natural to the fish. The specimen was a male, the milt very solid, presenting no appearance of spermatozoa when broken down and magnified."

Mr. Couch says of this species that—

"It takes the common baits which fishermen employ for other fish, but feeds much on marine vegetables, upon which it becomes exceedingly fat."—*Yarr. B. F.* vol. i. p. 131.

This single specimen, as will be seen from the preceding notes, attests the correctness of the remarks respecting both bait and food.

All the British localities for this species, named in the work just cited, are on the extreme southern line of the English coast.

After I had contributed the foregoing particulars to the Annals Nat. Hist. (vol. xviii. p. 313), I received a letter from Major Walker, of the Lodge, Enniscorthy, dated 15th November, 1846, in which he says—"I this year met with a black bream at Kilmore (County Wexford). It was of a dark steel-blue when fresh, but soon faded to black; it was of good size, about 18 inches long, and much firmer than the common red-bream" (*Pagellus centrodontus*).

Family SQUAMIPINNATI.

RAY'S SEA-BREAM, *Brama Raii*, Cuv. and Val.

To Dr. R. J. Burkitt, of Waterford, we are indebted for the positive addition of this species to our fauna, this gentleman having lately contributed a native specimen to Dr. Ball, for the Museum of Trinity College, Dublin. The fish (of which a large and correct drawing has been sent me) was taken at Tramore, in the month of October, 1843. This is the first certain instance known to me of its occurrence on our coast. Mr. Yarrell (British Fish. vol. i. p. 134) gives it from M'Skimmin's List of the Fishes of Carrickfergus; but, as remarked in my Report of the Vertebrata of Ireland, "the propriety of the application of the name to this species is doubtful." All that is said of it by M'Skimmin is, "*Sparus Raii*: hen-fish, a choice fish, rare." The term hen-fish is applied by our fishermen to one or two other species of somewhat rare occurrence.

Family SCOMBRIDÆ.

THE MACKEREL, *Scomber Scomber*, Linn.,

Is common around the coast, Belfast Bay, Strangford, Dublin, and Youghal. On 20th April, 1846, I saw several dozen of mackerel, about

one-fourth under full size, in Belfast market, to which they had been brought from some of the northern Highland lochs of Scotland; but I have not any record of the occurrence of this fish on the Irish coast so early in the season.

When at Newcastle (County Down) on 2nd September, 1836, I made the following note:—"Mackerel have only been taken at Newcastle within the last fortnight, although 10 miles southward they were caught a month before. This difference in time (I am informed by Mr. G. Hyland) is annually observed."

The modes of capture of the mackerel have been described in Smith's Waterford, and Maxwell's Wild Sports (the description contained in the latter work having been considered by Mr. Yarrell worthy of a place in his work on British Fishes); but the following extract from Dr. Ball's lecture, already quoted, will sufficiently inform the readers as to the means usually employed:—

"The mackerel is taken in various ways, one of which is very attractive to the amateur. It is fishing, while under a smart sail, with a line and single hook; the bait may be anything bright, such as a bit of red ribbon. The first fish caught will supply a more attractive one, called a lashing, being a narrow band cut from the silvery part near the tail of the fish. They are also taken by boys who fish from the rocks with a rude apparatus consisting of a pole, a piece of rope-yarn, with an appended fly, made of a crooked nail, with a white feather and red worsted attached, but the greatest numbers are caught in drift-nets."*

In the months of July and August, 1850, mackerel were unusually abundant on the North-East coast, and great numbers were taken in Belfast Bay, Strangford Lough, and at Newcastle. On the 24th August, 26 boats were employed in fishing between Greypoint and Crawfordsburn (Belfast Bay), and with great success. Twenty-nine dozen were taken by one boat, and the others captured smaller numbers, varying down to 12 dozen each. One of the fishermen at Newcastle (James Hill) informed me that 4 men in his boat took 100 dozen in 8 hours—*i. e.* 4 hours in the morning and 4 in the afternoon. Another crew of 3 men were said to have caught 35 dozen in the course of one morning. The bait generally used was a piece cut from the side of a freshly-caught mackerel, but I knew one instance of the spotted gunnel (*Murænoides guttata*) being used successfully.

When in pursuit of herring-fry swimming at the surface, mackerel are said to cause the semblance of a heavy shower upon the water.

The Spanish Mackerel, *Scomber maculatus*, Couch.

In the Annals of Nat. Hist. (vol. vii. p. 479) I published the following note relative to this species. I have not been able to obtain more definite information respecting it:—

"*Scomber maculatus*, Couch? Spanish Mackerel. Mr. McCalla, having mentioned the occurrence of this fish on the coast of Connemara, replied to my queries as follows:—'The fish which I consider to be this, is found with the mackerel, and, in some seasons, not uncommonly. It is known by the name of Spanish Mackerel, which was no doubt first applied to it here by the coast-guard, many of whom have been in the navy. I have not seen any specimens of *S. maculatus* this year (1840), but on carefully looking to the characters given by Couch (Jenyns's Manual) am of opinion that it is the above species. I

* "A novel and successful bait recently used, is about two inches of the stem of a tobacco pipe, put on the line down to the hook."—*R. Ball.*

am quite positive that we have two species of *Scomber* on this coast. *Caranx trachurus* has been scarce here this year.'"

I should mention that the late Mr. John Nimmo, when examining with me the figures in Yarrell's British Fishes, stated that the Garfish (*Belone vulgaris*) is called *Spanish Mackerel* by the fishermen at Roundstone.

THE TUNNY, *Thynnus vulgaris*, Cuv. and Val.

The following note, contributed by me to the Annals of Nat. Hist. (vol. v. p. 9), contained the only information which I then possessed respecting the tunny, as an Irish species:—

"Dr. Jacob (Professor of Anatomy in the Royal College of Surgeons) of Dublin informs me, that during the herring season, about twelve years ago, he purchased a specimen of this fish, about 2 feet in length, (and evidently a recent capture,) from a fisherman who supplied him with the rare species he procured, and whose ordinary fishing-ground was off Dublin Bay, within forty miles of the metropolis."

In the Autumn of 1841, a large tunny was obtained in Ballyholme Bay, near Bangor, in the County of Down. Full particulars of its capture were given in the *Northern Whig* newspaper, of 4th Nov., 1841, from which I take the annexed extract:—

"It measured 8 feet 3 inches in length, 5 feet 4 inches in girth, and was estimated by several gentlemen who saw it to be fully 300 lbs. weight. It was first observed by a farmer in the neighbourhood, floundering on the sand in a place where the tide was rapidly ebbing; and, from the powerful struggles and tremendous plunges which it made when it found the water leaving it, seemed much larger than it really was."

THE BONITO, OR STRIPE-BELLIED TUNNY, *Thynnus Pelamys*, Cuv. and Val.

Of this species, which is rarely captured in the British seas, an example, taken on the coast of Wexford some years ago, was sent in a fresh state to the Royal Dublin Society, and is preserved in their Museum; its length is 29 inches.

Dr. Harvey, in his Cork Fauna, gives the following note:—

"*T. Pelamys*, Linn. (sp.) (?)Bonito. My friend, Dr. Bullen, informs me that he saw and examined an individual of this species, which was taken at Kinsale, some years since."

In June, 1850, I saw a fine specimen of this fish in Mr. Yarrell's collection, sent to him by Mr. Bennett, from the South of Ireland, which was thus noticed in the *Cork Constitution* of 1st Sept., 1849:—

"A specimen of the Bonito, a tropical fish rarely found upon our shores, was taken, on Monday last, in the meshes of a salmon net at Bennett's Court. It has been forwarded to Mr. Yarrell, from whose History of British Fishes the following description has been adapted to the present subject, which is a trifle larger than the one described in that work:—This specimen is 29½ inches long; 21 inches round, close behind the pectoral fins; head conical, ending in a point at the nose; under-jaw projecting; teeth very small and close, like a file; mouth small; tongue flat and thin; nostrils obscure—and in a depression; gill-covers of two plates. Body round to the vent; from thence tapering to the tail; near the tail depressed; eye elevated, round, near an inch in diameter; iris silvery; from the nose to the pectoral fin 9¾ inches; the fin pointed, 3 inches long, received into a groove, in which another inch or inch and half of this fin might have remained sunk—first dorsal fin 7½ inches long, 4½ inches high, lodged in a groove. The body is most solid opposite the second dorsal, which fin and the anal are falcate; weight, 19½ lbs.; colour, deep azure blue on the back, with

shades of green, gold, and crimson on the lower parts of the sides and belly; four longitudinal stripes extend along each side to the tail, which is crescent-shaped, and 8 inches in diameter. The beauty of the colours, when fresh from the water, it is impossible to describe. This is supposed to be the first specimen of the Bonito ever taken in our harbour."

I am indebted to Dr. Scouler for the following note:—

"The fish concerning which you inquire was the *Thynnus Pelamys*. It was taken somewhere near the estuary of the Clyde, and was brought to the Glasgow market, where it was supposed to be an enormous mackerel. I purchased the specimen for the Museum of the Andersonian Institution of Glasgow, where it still is, I have no doubt. The fish could not be mistaken for the *Pelamys sarda*; even colouring is sufficient to distinguish the species. In addition to the specimen here alluded to, I may inform you that there is one in the Museum of the Royal Dublin Society, which, I have every reason to believe, was taken off the coast of Ireland; however, be that as it may, there can be no doubt whatever as to the authenticity of the Glasgow specimen, which is clearly the *Scomber* or *Thynnus Pelamys*."

I subsequently learned from Dr. Ball that the specimen in the Dublin Society collection was obtained in a fresh state, and preserved by Mr. Wall, a taxidermist formerly resident in Dublin.

The Sword-Fish, *Xiphias gladius*, Linn.?

Dr. Ball has supplied me with an extract from a book in which donations to the Dublin University Museum were entered. It announces the receipt of the "Sword-bone of the *Monoceros* or Sword-fish, together with the socket of the eye and remains of an animal taken out of its maw. This fish was taken in a net on the coast of Wexford, but is very seldom known to visit that coast.

"Presented by Mr. Carey (Carew?), 1786?"

Dr. Ball is of opinion that this note applies to the weapons, &c., of a *Xiphias* in the Museum, and not to the Sea Unicorn, *Monodon monoceros*, Linn., which might also possibly occur on the Irish coast. I have been told, but not with sufficient certainty to announce it, of the occurrence of the *Xiphias* upon another occasion on the southern coast.

Several individuals have been taken on the coasts of Scotland and England.

The Pilot-Fish, *Naucrates Ductor*, Cuv. and Val.

Dr. Harvey thus notices the pilot-fish, in his Cork Fauna, (1843):—

"An example of this species (now first introduced into the catalogue of Irish fishes) was captured about two years since at Crookhaven, in the West of this County, and sent by Mr. Notter to Mr. W. T. Jones of this city. It is preserved, and in Mr. Jones's possession."

This is the only record known to me of the occurrence of the pilot-fish on the Irish coast.

The Scad, or Horse-Mackerel, *Caranx Trachurus*, Lacepede,

Is taken around the coast, but in much greater quantity on the southern and western coasts, than on the northern and north-eastern. It is in little estimation for the table, and is consequently sold at a very low price.

The stomach of a specimen, caught with mullet, in Belfast Bay, on 14th Aug., 1845, was filled with young *clupeæ*, of which there were several 2¼ inches in length. Neither milt nor roe was perceptible in this fish.

I extract the following from Dr. Ball's lecture already quoted :—

"The scad or horse-mackerel is very abundant on the southern shores; it is much valued by the poor, and is caught in the same way as mackerel. I have seen the scad run up on shore in considerable numbers; whether in pursuit of young sprat called *Scad-bait*, or to avoid porpoises (*Delphinus phocæna*), which were conspicuous in the rear, I do not know."

Aug. 11, '37.—A specimen of this fish, which I obtained in Belfast market, was as follows:—Length, 17 inches; 77 or 78 plates on lateral line, the last 42 "with keels terminating backwards in sharp points."

D. 8—1|30; A. 2—1|27; C. 18; P. 21; V. 1|5. With Mr. Jenyns's description of form and colour it agrees in all details but those above noted, and the irides being silvery instead of "golden." The throat and under-part of the jaw are black. I was uncertain as to its sex: a specimen obtained by Dr. Ball had more rays in D. and A. fins than mentioned by Mr. Jenyns.

THE DORY, DOREE, OR JOHN DORY, *Zeus Faber*, Linn.,

Is found around the coast, but very sparingly in some localities. Their numbers increase northwards, and I am credibly informed that about twenty are taken in the vicinity of Portrush for one in Belfast Bay.

From early Spring until late in Autumn I have occasionally seen specimens in Belfast market, but none of large size like those brought to London. A female, which I dissected on 13th May, contained pea of very small size, but in such immense quantity as to show that this must be a very prolific fish.

The stomach of a dory about 12 inches in length, taken near Cultra (Belfast Bay) on 1st July, 1848, was filled with the remains of a young plaice; another obtained in the month of October, at Carrickfergus, contained portions of a full-grown *Gobius minutus* and of a fish apparently of the same species; in a third specimen, which I examined in the month of May, I found a sand-eel.

THE OPAH OR KING-FISH, *Lampris Luna*, Flem.,
— *Guttatus*, Cuv. and Val.,

Has been obtained in a very few instances.

The first of which I have any knowledge was noticed in Sampson's Derry, and a figure of it published. It is said to have been

"found on the flat shore of Magilligan, alive; probably pursued till grounded. Through the indulgence of the Dublin Society, the reader has an engraving of this beautiful fish; the original is deposited in the Society's rooms." P. 337.

No date of capture is given, but the work appeared in 1802. The specimen is said to have been

"2 feet long, 10 inches broad; fins scarlet; upper part of body green; belly silver; spots bluish white; weight about 14 lbs."

It is not now in the Society's collection.

In a letter which I received from Dr. Burkitt, of Waterford, in April, 1843, that gentleman gave me the following information :—

"Oct. 27, 1842.—I obtained a specimen of the Opah Doree or King-fish, which was taken near Tramore. . I have preserved the half of it—

Its length is 16 inches; breadth exclusive of fins 9 inches; fins, upper, about 8 inches; under, about 7."*

This specimen was exhibited by Dr. Harvey at the Cork Meeting of the British Association, in 1843, (see Cork Fauna, p. 19, note,) and is now in the Dublin University Museum.

In June, 1849, the following paragraph appeared in The Derry Standard:—

"A Rare Fish.—The *Opah Dorey*.—A fish, which is rarely met with in the Irish Channel, or adjoining the Irish coast, was caught at Innistrahull, not far from the light-house, and brought to the fish-market here, on Wednesday last, which excited a good deal of curiosity. In shape it bears a strong resemblance to the turbot, but still more solid, weighing, although not apparently large in size, upwards of 55 lbs. The fins, which are placed near the shoulder, are of a blood-red colour, and the entire skin is beautifully variegated with spots of black, yellow, red, and gold-coloured hues. On examination, by persons versed in natural history, it was found to belong to the celebrated 'John Dorey' tribe; being, in fact, one of the Opah Dorey variety. In the year 1835, a fish of the same rare description is stated, in the Ordnance Survey, to have been caught in the Foyle."

A beautiful specimen of this fish was taken at Wexford, in August, 1849—weight 59 lbs.—*Dr. Ball.*

On 2nd July, 1850, an Opah was seen struggling at low water in one of the gullets of Belfast Bay, off Whitehouse, at 2½ miles from town. A little boy, who observed it, succeeded in effecting its capture by putting his handkerchief round its gills. This specimen is now in the Belfast Museum.

"A very fine specimen was captured near Skerries, in 1851, and is now in the University Museum."—*R. Ball.*

Family TÆNIOIDEI.

The Red Band-fish or Red Snake-fish, *Cepola rubescens*, Linn.,

Has been obtained on the Southern and Western coasts.

The following is an extract from a letter received from Dr. Farran, dated 31st August, 1850:—"I mentioned the occurrence of *Cepola rubescens* to you in this locality. The specimen I procured was thrown ashore at Stradbally, in this County, after a heavy gale, in Dec., 1848. The fishermen state that it is of frequent occurrence, its habitat lying in the forests of sea-weeds which grow about the coast."

[We have been informed by Dr. Ball that several specimens of this fish, which have since been captured by Professor Melville on the Western coast, are now in the Dublin University Museum.—Ed.]

The annexed notes on the Red Band-fish were contributed by me to the Magazine of Nat. Hist., new series, 1838, p. 214:—

"A remarkably fine specimen of this fish, which, as British, was, until last year,† known only to the southern shores of England, was found on the beach

* The length of the dorsal and ventral fins in this specimen is much greater proportionately than in any figure or specimen seen by Dr. Ball.

† When the above was written, I had overlooked the following note, which appeared in the Magazine of Zoology and Botany, for June, 1837, (vol. ii. p. 93).—"*Cepola rubescens*, Linn.—Dr. P. W. Maclagan informs us, that he has lately procured a specimen of this fish, which was caught off Dunure, seven miles south of Ayr, on a whiting-line, baited with a mussel. Its length is 15½ inches. The fisherman who brought it had seen another about six weeks ago. —March 20th, 1837."

near Ballintrae, on the coast of Ayrshire, on the 29th of November, 1837, after a severe storm.

"It was taken to Dr. Wylie, of the village, who, on learning from the fishermen that the species was unknown to them, most liberally transmitted it to me.* In consequence of its size, and its being received in a perfectly recent state, I here transcribe some of my notes, made on comparing the specimen with the descriptions of various authors, before it was transferred to spirits.

"The largest English *Cepola* on record, is described by Mr. Couch in the Linnæan Transactions (vol. xiv. p. 76) to have been 15 inches in length. Cuvier and Valenciennes observe (Hist. des Poiss. t. x. p. 398) that their specimens were a foot long; but add, that the species has been found a foot and a half in length. The present specimen, although broken off near the tail, is 19½ inches long; and as the body, when perfect, tapers to a point, and that of the individual under consideration is 2 lines deep at the fracture, I should consider, judging from the gradual diminution of its depth before this part, that it must have been from about two to three inches longer. The depth of the head is 1 inch and ½ a line; the greatest depth of the body (just behind the gill covers) is 11 lines, or 1½ line less than the depth of the head, and thence it tapers gradually towards the tail. Its thickness close to the head is 4½ lines, at the centre 1½ line, and at the extremity ½ a line. Its weight is scarcely 1 oz.

"The species has been generally described as destitute of scales. Mr. Yarrell, however, states, that a specimen sent to him by Mr. Couch, 'exhibits, here and there, an occasional thin, oval, semi-transparent scale.'—(*Br. F.* vol. i. p. 197.) It is remarked by Cuv. and Val.—'Les ecailles de la Cépole sont extrêmement petites, ovales, lisses, entières, insensibles au tact, ne s'imbriquent point, et se présentent à la loupe comme autant de petits pores enfoncés et disposés en quinconce serré; ce n'est qu'en raclent la peau, qu'on en détache et qu'on peut les voir séparément: la tête et les nageoires n'en ont aucunes.' (t. x. p. 397.) My specimen entirely coincides with this description, but it may be further observed, that its scales increase gradually in size from the head towards the tail, and that in approximating the latter they are apparent to the naked eye; from being more sunk in the skin, in addition to their smaller size, they are not thus visible on the anterior part of the fish;—with a low magnifying power the longitudinal *striæ* of the scales on the posterior portion are conspicuous.

"The *Cepola rubescens* and *C. tænia* are described by authors who hold them to be distinct, the former as possessing one, and the latter two, rows of teeth in the lower jaw. Donovan (British Fishes, No. 105) and Yarrell † have considered that this difference may be owing to the age or size of the individual. Risso in his Histoire, (ed. 1826, tome iii. p. 294,) in which the *C. rubescens* and *C. tænia* are brought together, though in his Ichthyologie they were regarded as distinct, attributes 14 teeth to the upper and 16 to the lower jaw. Cuvier and Valenciennes enumerate 17 or 18 teeth on each side of the upper jaw, and 10 on each side of the under, behind which 2 appear, and add that they vary a little in individuals. My specimen, considerably exceeding in magnitude the *Cepolæ* examined by these authors, exhibits 41 teeth in the upper jaw (cavities denote that many are wanting) and 25 in the lower, of which latter 17 are in a tolerably regular row, inside of which is 1 tooth, and outside it 7, which are equal in length to the largest in the row, but not so much hooked. The tongue is smooth.

"The lateral line is apparent only on close examination, being a mere faint-co-

* This specimen afforded an illustration of the correct application of *Tænioidei*, or "Poissons en ruban," to the family in which it ranks, in a point of view that, in all probability, was *overlooked* by Cuvier. Although 19½ inches long, it was folded up like a riband, and forwarded through the post office, under cover of a franked letter of ordinary size and legal weight.

† In a specimen 7½ inches long, this author found one tooth in the line of the second row; and in an individual 13 inches in length, six teeth constituted this row.—*British Fishes*, vol. i. p. 197.

loured line, sloping downwards for a short distance from its origin, and thence extending in a straight direction towards the tail, about equidistant from the dorsal and ventral profile. From the upper point of the *pre-operculum*, a row of bone-like processes slopes upwards to the base of the dorsal fin, and thence continues throughout the entire length of the fish, giving it a carinated appearance; along the base of the anal fin a similar carination extends.

"In the dorsal fin the three first rays only are inarticulated and simple, but they are as flexible as the rest; the fourth ray, and those which follow, are both articulated and branched. All the rays of the anal fin are articulated: the first is simple; the second and succeeding ones are branched. The fin-rays are in number—D. 71; A. 63; P. 17; V. 1+5.*—Branch. mem. 6 rays.

"The upper portion of the head and body is a deep rose colour, shading gradually downwards to a paler hue; posterior part of the body of a uniform deep rose colour; base of the lower jaw carmine; space before and above the ventrals and *pre-operculum* bright silver; *irides* silvery, tinged with rose colour, pupils bluish black; membrane uniting the outer extremity of the inter-maxillary with the maxillary, dusky, or clouded with black, which latter colour it is described to be by Cuv. and Val. The extreme anterior portion of the dorsal and anal fins dark and pale rose colour, irregularly disposed, and bordered with a narrow line of reddish lilac, which gradually increases in breadth posteriorly, forming a beautiful termination to the greater portion of these fins; in both the anal and dorsal, the rays are of a deep carmine hue, the connecting membrane is either generally of an orange yellow, or reddish lilac, at the base, the centre carmine, and the border reddish lilac, which colour is separated from the orange yellow by a narrow line of deep carmine. The pectorals have a slight tinge of deep rose colour; the ventrals are pure white. There is not the least indication of any transverse bands, as are figured by Montagu † (Linn. Trans. vol. vii. pl. 17) and described by Risso. The latter author mentions a reddish spot at the origin of the dorsal fin. At 1½ inch from the commencement of this fin in the present specimen, a somewhat oval spot, of a deeper red than the surrounding parts, originates, and extends for the space of half an inch.

"The term 'Riband Fish' applies equally well to the colour as to the form of this *Cepola;* as the much darker hue imparted by the carmine-coloured rays of the dorsal and anal fins, when lying close to the rose-coloured body—throughout the entire length of which they are continued—gives it strikingly the appearance of a bordered riband; and may, indeed, when so viewed, have suggested the trivial name of *marginata*, to what was considered a distinct species: vide Cuv. and Val. t. x. p. 392.

"The *C. tænia*, as described by Bloch, chiefly differs from the *C. rubescens* in the carination at the base of the dorsal and anal fins; in having two rows of teeth in the lower jaw, instead of one; in having the tongue rough, rather than smooth; in wanting the silvery bands of *C. rubescens;* and in having many red spots on the sides. Of these characters, two are present, and three wanting, in this specimen. It has the double row of teeth, and a single inner tooth in addition, suggesting the idea of a third row; and likewise the carination on either side the base of the dorsal and anal fins. Not only the transverse bands, but the spots also, are absent. The difference between the smoothness and roughness of the tongue might, I conceive, arise from the mode of preservation, for, if

* The ordinary number of rays thus appearing in the D. and A. fins (70 being commonly attributed to the former, and from 60 to 63 to the latter—Donovan describing 69 in the A. fin of his specimen, which was 11 inches in length) may seem against the presumption that the specimen was from two to three inches longer than at present, as the depth of the broken extremity denotes; but in the fins of fishes generally, having many rays, I have found the number to differ very much in individuals of the same species.

† The two coloured figures of English specimens (Montagu's and Donovan's), in which these fins are expanded, give no idea of this marginated appearance, nor, indeed, from the same reason, do any figures I have seen.

originally smooth, the tongue would probably continue so, were the specimen preserved in spirits, although, were it preserved dry, this organ might become rough. In the number of rays in the branchiostegous membrane and in the fins there is a general agreement between Bloch's *C. tænia* and the specimen under consideration. The *C. tænia* is described to have in Branc. memb. 6; P. 15; V. 6; A. 63; C. 10; D. 66.

"It seems unnecessary to extend the description any further, or to those characters on which authors are agreed. In the 10th volume of the Histoire Naturelle des Poissons, of Cuvier and Valenciennes, which did not appear in time to be quoted in the excellent volumes of Mr. Yarrell (Brit. Fishes), and Mr. Jenyns (Man. Brit. Vert.), the *C. rubescens* is treated of in the usual full and complete manner characteristic of that great work. The subject occupies thirteen pages, in which the *C. rubescens* is set forth as the only species of its genus yet discovered in the European seas, the *C. tænia*, *C. marginata*, &c., being rejected as species. I have, nevertheless, thought it might not be useless to describe the present individual, so far as I have done, in consequence of its superior size to Cuvier and Valenciennes' specimens, and which did not come under their observation in a recent state.

"Of four Mediterranean specimens (preserved in spirits) of *C. rubescens* which I have examined, and which were obtained at the Ionian Islands, by Robert Templeton, Esq., of the Royal Artillery, and presented, along with many other fish from the same locality, to the Natural History Society of Belfast, one is 6 inches, and the other three from 9 to 10 inches in length. The smallest is very considerably compressed, quite as much so as the largest, although an individual of about equal size, described by Mr. Couch (Linn. Trans. vol. xiv. p. 76), was nearly round, from which some authors have inferred that this is the general form of the species in a young state. In the two larger individuals, which are in better preservation than the others, the series of bone-like processes appear on the dorsal ridge, and also on the ventral, though less conspicuously. In all, the tongue is smooth. In none of them are there any teeth, either inside or outside the row on the lower jaw, and in both jaws the teeth are much fewer in number than in the large specimen which is the subject of this communication."

Family MUGILIDÆ.

THE THICK-LIPPED GREY MULLET, *Mugil Chelo*, Cuv.,

Frequents the East coast, from North to South, but whether or not it is the mullet found around the island I have not had the means of judging. All of those which I have critically examined from the North-East coast, from Dublin, and from Cork, were of this species.

The following notes were communicated by me, in 1838, to the Annals of Nat. Hist. (vol. i. p. 350):—

"On endeavouring, in the spring of 1835, to identify the common mullet of Ireland with Cuvier's species in the Règne Animal, I perceived its agreement with the few characters there attributed to *M. Chelo*, but before recording it as this species, awaiting a comparison with a more detailed description. This has since been afforded me in the Histoire des Poissons of the same illustrious author; and, together with the accompanying figure illustrative of the head of *M. Chelo*, confirms, beyond a doubt, the identity of the species.

"In the justly valued works of Yarrell * and Jenyns,† Mr. Couch is mentioned as the only naturalist who has noticed the appearance of the *M. Chelo* on the British coast; but in a review of the British Fishes in the Magazine of Zoology and Botany, it is remarked, 'the thick-lipped grey mullet, reckoned so rare by Mr. Yarrell, as to have been seen only once by Mr. Couch, is the common

* History of British Fishes. † Manual of British Vertebrate Animals.

species on the eastern shores of Scotland, where we believe his grey mullet is not known at all, or is at least far from common. At the mouths of rivers the former is taken in considerable numbers in autumn.' Vol. i. p. 390. Every mullet that I have had the means of examining at Belfast, since first giving attention to them in March, 1835, was of this species, as were likewise the only two individuals that I have seen from the southern coast of Ireland. These are in the collection of Dr. R. Ball, of Dublin, and were taken at Youghal in the County of Cork.

"As information on the history of this species, at least as distinguished from others, is very scanty in all the British and continental works I have had the opportunity of consulting, I have thought proper to enter into the following detail.

"Notwithstanding the great increase of shipping of late years at Belfast, the mullet is as plentiful in the bay as it was ever known to be by the few persons engaged in its capture. By much the greater number are taken here in trammel or set-nets, but at low water the sweep or draught-net is used in the gullets,* and also, in addition to the former kind, is employed in fishing for them within the flow of the tide in the river Lagan. They are generally sought for from about the middle of March until the beginning of October, and are occasionally taken before and after these periods. They probably never migrate far, as in two different years, in the month of January, dead individuals were washed ashore in the bay. The fishers are, for their own sake, entirely guided by the weather, which must be moderate, it being by night that the mullet is taken in the greatest numbers, as, by reason of the darkness, they cannot, by leaping over it, so well avoid the fatal net, though even then they occasionally so escape. In clear moonlight, and by day, fish of every size often clear the net, sometimes springing five and six feet over it, and when one has set the example, nearly all are sure to follow it; having surmounted the meshy barrier, they sometimes take two or three additional leaps, and skim the surface beautifully before again subsiding beneath it. In the stillness of the night it is said that by leaping and plunging about they make the water seem quite alive. In the bright sunny days of summer, which they evidently much enjoy, a whole shoal of mullet occasionally exhibit their dorsal fins above the surface of the water, and when there are neither nets nor other objects to obstruct them, may, in playfulness, be seen springing a few feet into the air. This generally occurs at high water, when they appear to be more intent on roving about than feeding, and penetrate as far up the river as the tidal wave will bear them; at such times they have frequently been captured in May's dock, within the town of Belfast.

"Of their time of spawning I cannot speak with certainty, nor have any individuals that came under my observation from March to September been in the least degree spent by it, all being firm and well-formed fish. When, on the 3rd of January, 1835, in search of marine productions outside the entrance to Strangford Lough, County Down, and accompanied by Mr. Hyndman, a specimen of this mullet, under 2 inches in length, was captured, and in the middle of September I have seen others of 9 inches in length.

"They are chiefly found in the most oozy parts of the bay, and where the grass-wrack (*Zostera marina*) is abundant. In search of food they make considerable excavations, which the fishers distinguish by the name of mullet-holes.†

* * * * * * * *

"The species of fish frequenting the coasts of Down and Antrim may be stated, in general terms, commonly to attain the extreme size with their kindred in the Mediterranean, and the *M. Chelo* proves not an exception, as specimens taken

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* These are narrow and often deep channels of water intersecting the banks over which the tide flows. In using the draught-net here, the smaller fish in leaping over it sometimes alight on the banks—at this time dry—to their destruction.

† Pennant observes, that the grey mullet "keep rooting like hogs in the sand or mud, leaving their traces in form of large round holes."—*Brit. Zool.*, vol. iii. p. 437, ed. 1812.

in Belfast Bay have considerably exceeded in this respect any of those I find recorded to have been obtained in more southern seas.* The ordinary weight is from 2½ to 5 lbs.; the largest procured by the respective mullet-fishers (all intelligent men of other occupations, and who pursue this chiefly as a pastime) have varied from 8 to 12½ lbs. The heaviest of which I have heard, was taken in the day-time, by my relative, Richard Langtry, Esq., and, being accurately weighed, proved to be 14¾ lbs.; this gentleman has likewise captured several of 9 and one of 10 lbs. weight.

"I shall here condense a series of observations made on this species at Belfast during the last three years. It will be seen that it is not obtained in any great quantity. On the 25th of March, 1835, about sixty individuals taken in the bay, and the first this season, were brought to market, where nearly all of them were alive when I saw them, though none had been less than three hours out of the water; they were from 16 to 20 inches in length. On the 27th and 28th larger fish were captured; several of equal length—2 feet—that I had weighed, were 5½, 6, 6½, 7, and 8 lbs., thus showing that the weight is rather a consequence of depth than length; all were equally firm and solid. About the 1st of May this year the greatest number occurred; in one net 7 cwt. were procured at a single draught, and on the same night about 9 cwt. by another boat. They were sold at 4*d.* per pound to the fish-venders in the market, and retailed at 6*d.*; at these rates they have been throughout the season. The best fish brought in by the one boat weighed 7 lbs., by the other 11 lbs. 12 oz., being the largest example obtained this year.

"In 1836 the first mullet were taken on the 18th of March. The greatest quantity obtained any night during this year was on the 11th of April, when 2 cwt. was procured by one boat, and at the same time upwards of 2½ cwt. by another. On the 13th of May many fine fish were taken; one which I weighed was 8½ lbs., and several more, judging from appearance, were not less; these were about 2 feet long, and some individuals, apparently not heavier, were somewhat above this length. On the 12th of August a quantity was taken. On September the 13th I saw a few specimens about 9 inches long, on the 16th many of ordinary size, and on the 22nd several about a foot in length. With reference to the small fish, it must be remarked, that individuals of herring-size form part of the shoals in spring, but in the set-nets used at that period none under 2 lbs. are 'meshed.' The smaller ones are all taken in draught-nets, employed at a later period of the year. The largest fish obtained this season weighed 12½ lbs. They were sold regularly at the same prices, wholesale and retail, as in 1835.

"Towards the end of July, 1837, I on different occasions saw specimens about a foot in length, which were taken in the river Lagan, and with them young herrings (*C. Harengus*), from 4 to 5 inches long, were captured. The greatest quantity of mullet secured this year at one draught was ninety-two fish, weighing 3 cwt.; they were obtained on the 10th of August. Until the 22nd of September mullet were brought to market, and on this occasion in large quantity. The best fish of 1837 was about 10 lbs. weight. During these three years the largest captures were all made about Garmoyle, a deep portion of the bay, about three miles from town. This fish is sought for only with nets. An acquaintance out eel-spearing in the bay, once struck and secured with his spear a mullet of 5 lbs. weight, as it was swimming on the surface of the water.

"With reference to European mullets generally, it is remarked in the Hist. des Poiss. of Cuv. and Val.: 'Les anciens, qui donnaient à tout une couleur poétique, ont en conséquence fait du muge le plus innocent, le plus juste, des poissons; tout au plus mangerait il ceux qu'il trouverait morts,' t. xi. p. 77. Mr. Couch, apparently from his own observation, says of the *M. Capito*, 'it is indeed the only fish of which I am able to express my belief that it usually selects for food nothing that has life.'—*Yarr. Brit. Fish.* vol. i. p. 204. With the *M.*

* Risso states that they attain the weight of 8 lbs. Cuv. and Val., judging from the size of the head, as represented in a collection of Spanish engravings, consider that the *M. Chelo* may attain two feet in length, t. xi. p. 51.

Chelo it is, however, far otherwise, as the contents of the stomachs I have examined at various seasons, presented, from the minute size of the objects, many hundred-fold greater destruction of animal life than I have ever witnessed on a similar inspection of the food of any bird or fish. From a single stomach I have obtained what would fill a large-sized breakfast cup of the following species of bivalve and univalve mollusca (which had been taken alive)—*Mytilus edulis*, *Modiola Papuana* (of these very small individuals), *Kellia rubra*, *Skenea depressa*, *Littorina retusa*, *Rissoa labiosa* and *R. parva*, *Serpulæ* and *Miliolæ*. Of these mollusca, specimens of *Rissoa labiosa*, three lines in length, were the largest, and the *Kellia rubra*, from the smallest size to its maximum of little more than a line diameter, the most abundant. In the profusion of specimens it affords, the stomach of one of these mullets is quite a store-house to a conchologist. In addition to these were various species of minute crustacea. The only inanimate matter that appeared, were fragments of *Zostera marina* and *Confervæ*, which were probably taken into the stomach on account of the adhering mollusca. To this nutricious food may perhaps be attributed the great size this fish attains in Belfast Bay.

"In the Règne Animal (t. ii. p. 232, 2nd ed.), Pennant's figure of the grey mullet in his British Zoology is referred to as *M. Capito*, but in the Hist. des Poiss. of Cuv. and Val. (t. xi. p. 66) it is believed to represent *M. Chelo*. In this last work Donovan's figure of the mullet (Brit. Fish. pl. 15) is considered a very good representation of *M. Chelo*. With this opinion I fully coincide, although Yarrell and Jenyns refer to both figures as *M. Capito*.* The descriptions of Pennant and Donovan throw no light upon the subject, nor are we informed whence the specimens were obtained that served for their illustrations. Pennant's figure exhibits the longitudinal lines reaching about as far as they generally do in *M. Chelo*; but Donovan, on the other hand, portrays them as extending to the ventral profile; in the more important characters, however, of the form of the operculum and mouth, his figure represents this species. I may add, that its greater than ordinary depth, which induced Mr. Yarrell to remark that the proportions of Donovan's grey mullet approach 'more closely to those of *M. curtus* than to those of the common grey mullet of this country,' (Brit. Fish. vol. i. p. 211,) seems not to me, from the great diversity of depth in different individuals, to militate against its being the *M. Chelo*.

"The following is a description of a specimen examined on the 21st of July. Total length, 22 inches; greatest depth, $5\frac{1}{4}$ in.; thickness, $3\frac{1}{4}$ in.; weight 5 lbs. D. 4—1 | 8; A. 2 | 9; P. 17; V. 1 | 5; C. 14.—Br. 6. In *form* it well agrees with the detailed description of Cuv. and Val., t. xi. p. 51, *et seq.*† The *colour* of the back is, as there described, of a fine steel blue; thence it becomes gradually lighter towards the under surface, which is pure opaque white, glossed with silver; a blackish line extends throughout the centre of the first ten rows of scales, ending with the row beneath the base of the P. fin, and giving to the fish its lineated appearance. Entire top of the head and upper lip greyish black; sides of the head just behind the eyes deep gold colour; lower part of the head or base of the opercula pure white; irides purplish black; outer base of P. fin, and the body above and below it, tinged with gold; remainder of the P., the D., C., and A. fins greyish black, the last becoming lighter posteriorly. V. fins white, tinged with very pale flesh colour.

"This specimen accords with the description extracted by Mr. Yarrell from the Fauna Italica, with one exception—'the rays of the spiny D. fin [are there stated to be] longer than half the depth of the body'—(vol. i. p. 208). In this individual they are only $\frac{1}{2}$ of its depth. In another specimen 20 inches long, the 1st and 2nd D. rays are equal, and $1\frac{3}{4}$ inch long, the depth of the fish being about 5 inches. In an individual of 11 inches the 2nd D. ray is equal to one-

* Mr. Yarrell has taken it for granted that the Irish mullet is of this species, vol. i. p. 202.

† The scales *generally* agree in every particular with the description at p. 52, but *some* do not either in proportion or sculpture.

half the depth, and in one of 10 inches is as 1 to 2¼. Owing to the speci[illegible]s varying very considerably in depth, as elsewhere shown, this must necessari[illegible]y be a very uncertain character."

Although the period stated (from the middle of March to the begi[illegible]n-ning of October) is the usual time of capture in Belfast Bay, I have occ[illegible]a-sionally seen this fish in the market here in every month of the yea[illegible]r. During the winter season, they have been brought in fine condition fro[illegible]m Cushendall and Glenarm with salmon, of which a very few are there take[illegible]n in the sea.

Food of the Mullet.—The stomachs of a few mullets from Portafer[illegible]y, opened by Dr. Drummond, 4th August, 1838, were filled with minute larvæ, of which he informs me some were alive.

23rd October, 1838.—The stomachs and intestines of six mullets from Donaghadee, were filled with a minute *Asperococcus*, like *A. pusillis*. Some small pieces of other Algæ occurred, as one specimen of *Enteromorpha compressa* will show. That with the *Asperococcus* I have preserved on glass.

Larvæ from stomach of mullet taken at Portaferry, were 2 and 2½ lines long; 12 joints in body; head brown; body colourless, except centre, which is dark.

Of four specimens obtained at Donaghadee on 11th Oct., 1838, one contained ova, which, though minute, were apparent to the naked eye; another showed them hardly developed, and milt apparent to the unassisted eye was in one of the males. The stomachs of two were empty; those of the other two filled entirely with a minute *Asperococcus* apparent to the naked eye. I got Dr. Drummond to put some of it under his microscope, which proved the plant to be of this genus; the size of specimens was generally about half an inch in length. The lineated appearance extended in these fish to the ventral profile, as Donovan represents.

A. H. Haliday, Esq., after examining, at my request, a number of larvæ taken from the stomach of a mullet in the month of November, favoured me with the following remarks:—

"I have examined the larvæ found in the mullet's stomach. They seem to be all of one sort, but from the difference of size are evidently in various stages of growth, and perhaps none of them full grown. The multitudes of them found favour the conclusion, of which I have scarcely a doubt from their form, that they belong to some species of the genus *Chironomus*, several of which occur in the greatest profusion on our seacoasts. On comparison with the larvæ of *Ch. plumosus*, L. (the common red worm of ditches) the chief difference is in the form of the posterior extremity as follows: in place of two long and divaricated branches of the last segment with four shorter-pointed processes between them in pairs and the spiracles above their origin, prolonged into two slender tapering tubes, crowned with a whorl of fine hairs (in *Ch. plumosus*), I observe in these only a single cylindric false leg inclined downwards with a wart at its base on each side, including the spiracle: but this difference is no more than we may admit as specific, since we know the terrestrial larvæ of other species of this genus to be totally deprived of these appendages of the posterior extremity. The larvæ of the other genera in this family (*Chironomidæ*), even those of *Ceratopogon*, which are least remote, are more complex in their external structure: and among those of the remaining *Nemocera*, destitute of lateral spiracles, I know none which have much resemblance to these.

"The larvæ in the families *Bibionidæ*, *Scatopsidæ*, *Myretophilidæ*, and *Cecidomidæ* having the lateral spiracles, are out of the question."

On 19th Sept., 1843, great numbers of mullet were seen in Dunbar's dock, Belfast, where through previous summers they were frequently observed. They were described to me by an eye-witness as feeding about the ships' bottoms, especially those which had been long in dock or had "weeds growing on them." About the middle of July last my informant saw about forty mullet enjoying themselves by drinking in from a stream of fresh water as it joined the sea water of the bay.

In Sept., 1851, considerable numbers of mullet were observed at the quays at Belfast, close to where the principal town sewers are discharged. They were supposed to be feeding on the contents of the latter.

My friend, Mr. R. Patterson, has favoured me with the following note:—

"I have been informed by Mr. Joseph G. Thompson, Gardenhill, near this town (Belfast), that in order to induce the mullet to enter the narrow inlets or 'guts' where the nets are usually placed, it is customary to spread cow-dung at or close to the water's edge as an attractive food, which the fish will greedily devour. The mullet enters with the flow of the tide, and with the ebb of the water seeks again to retire. As soon as it finds its progress arrested by the net, it retreats a few feet, and then, 'with one brave bound,' clears the unexpected obstacle. This proceeding is so well known by the fishermen, that in order to obviate its effects they take the precaution of placing a second net a few feet apart from the first-mentioned one; and in this the mullet are found, their noses sticking in the meshes. Mr. Thompson does not give these particulars as matters of which he himself has been actually cognizant, but as details stated to him by an old mullet fisher since deceased, and who could have had no motive for giving erroneous information. The matter might be worth inquiring into.

"Mr. T. further states that mullet have frequently been taken under May's bridge, coming from May's dock, which from the number of sewers which are there discharged, and the want of any strong current to carry off the deposit, is at all times extremely filthy.

"Walking along the road to Carrickfergus on a fine moonlight night, when the tide was so unusually full as to come close up to the wayside, Mr. Thompson's brother has seen great numbers of mullet glancing rapidly along with their dorsal fins above water, and describes their appearance under such circumstances as highly animated and attractive."

Dr. Ball, in his lecture already referred to, says of this species:—"The grey mullet is found abundantly at the mouth of our rivers, and may be often seen in spring in considerable numbers from the Dublin bridges playing on the surface of the water. It also frequents the neighbouring harbour of Kingstown, where a dexterous individual kills many with a light spear."

Mr. Sinclair has known the mullet to ascend the river Lagan (Belfast), into the canal, where they were shut in by the gates: he has frequently seen them leap in the fresh-water.

January 27, 1841.—The largest *M. Chelo*, as to length, I ever saw, was in Belfast market to-day, having been taken with salmon at Cushendal. It was fully 2 feet long.

A specimen from Belfast Bay, which came under the inspection of a friend on the 2nd August, 1850, measured 28 inches in length, and 17 round the body.

April 16, 1840.—On looking to a great number of mullet to-day in

Belfast market, I found, as I had done before, that the space exposed or otherwise between the inferior edges of the inter-opercula varied exceedingly. All the fish I looked to were *M. Chelo*, and I found when the inter-opercula were brought together so as to touch, that generally a larger portion of the space under the tongue was seen then in Yarr.'s fig. of *M. Capito*, p. 240, 2nd ed. None of the specimens that I examined displayed the appearance of *M. Chelo* with the inter-opercula touching throughout their base so as to conceal the space below the tongue.

I suspect that some of the fish called *M. Capito*, said to have been taken on the Irish coast, were judged by this fallacious character, as it seems to me. My *M. Chelo* from N. and S. of Ireland is unquestionably that of Cuv. and Val. as figured and described.

Mr. James Radcliff, after perusing my notes on this fish published in the Annals of Nat. Hist., wrote to inform me that the mullet of New Zealand appeared to him to be of the same species, and that its habits are precisely similar to those which I had described.

THE GREY MULLET, *Mugil Capito*, Cuv.,

Is said to be taken on the East and South coasts.

Col. Portlock informs me that he submitted drawings of a mullet taken on the coast of Down or Antrim, to Mr. Yarrell, who considered them to represent *M. Capito*, but all the specimens which have come under my own examination were *M. Chelo*, which is our common mullet of the North.

In the Cork Fauna (1845), Dr. Harvey has given *M. Capito* as certain, and *M. Chelo* is noted with doubt.

THE ATHERINE OR SAND-SMELT,* *Atherina Presbyter*, Cuv.,

Is found at certain localities, from the coast of Down, southward to that of Cork.

It "is taken plentifully on the coast of Down, especially in Strangford Lough. Of about 40 specimens from this locality, which I examined in January last (1835), the average length was $6\frac{1}{4}$ inches; † a few were 7, and one was $7\frac{1}{4}$ inches long. Dr. Ball informs me that the atherine is not unfrequently taken along with sprats at Youghal, and that, on the 14th of September last, he saw a shoal of them at Portmarnock, County Dublin, in a pool in the sand below high-water mark."—*W. T.* in *Zool. Proc. for* 1835.

It appears to be a very local species. Belfast market is supplied from a limited portion of Strangford Lough, near Portaferry, only a few being taken in any other part of the Lough; and I am not aware of another locality for the species on the coast of Down or Antrim, save that I have heard of their having been taken at Newcastle, and that the stomach of a red-breasted merganser (*Mergus Serrator*), shot in Belfast Bay, in January, 1851, contained three young atherines, each about 3 inches long. Specimens were once sent to me which were stated to have been captured near Donaghadee, but I do not feel certain of this being correct. The atherine is said to be common on the coast of Wexford.—*Major Walker.*

In Rutty's Dublin, and Smith's Cork, "The smelt (*Eperlanus*)" is mentioned, but from the circumstances of the atherine being called smelt, and its occurrence on these coasts where the *Eperlanus* is not known, and also from the silence of both authors about a second species,

* Also called the "Smelt" and "Portaferry Chicken" in the North.

† In Dec., 1847, I received from Strangford Lough a specimen $7\frac{3}{4}$ inches in length.

I am disposed to believe that they meant the species under consideration. At the same time it appears singular that the true smelt should not frequent any part of the Irish coast, and this it cannot at present be said to do. The distribution of the smelt is rather singular. Mr. Yarrell remarks that it is unknown on the southern coast of England, where the atherine takes its place. It occurs along the eastern side of England and Scotland, and along the western side to the Solway Firth northwards.

In Daniel's Rural Sports, vol. ii. p. 217, it is remarked that Strangford Lough "abounds with excellent fish, particularly with *smelts*." It is evident, however, that the atherine is the species referred to.

The season during which the atherine is generally brought to Belfast market, is from December to April, both months inclusive; but, on 10th September, 1847, I saw a small basketful from Portaferry, and was informed that, on the previous day, the first supply had been brought thence. Not more than one or two large basketfuls are usually on sale here, and the price varies from 1*s.* 6*d.* to 4*s.* per hundred. They are eaten fried without the entrails being taken out.

Only two out of a dozen stomachs which I examined in the month of December contained any food, and I found in those merely the remains of crustacea, apparently of the genus *Mysis*. In fifteen others dissected in the month of January, I was unable to detect food, save that in two or three there appeared to be the remains of vegetable matter, about one-half of them contained roe.

The atherine is captured in Strangford Lough, by means of small nets, and generally before daybreak, snowy weather being considered the most favourable. This fish is said to make an excellent bait for haddock.

July 3rd, 1838.—When out boating near Portaferry, I was told by several persons that the atherines are all up the Lough now on the shallows, some say the *sleech banks* (*i. e.* those covered with *Zostera marina*), spawning; it is only in winter that they come down towards the deeper water about Portaferry. I was disposed to regard this as correct, from the circumstance of my having at the end of August, in the previous year (1837), taken the young atherine under an inch in length, along with young *Gobius minutus*, in a pool among the sand at the edge of the Lough, some miles further up near Killinchy.

It was not until after due examination had been made, that, in 1835, I announced the atherine of the North-East of Ireland as the *A. Presbyter*, although, from the scope of the work (Proc. Zool. Soc.) for which my observations were drawn up, it was considered better not to enter into any detail. The differences I then noted, from a comparison of specimens from the South of England and North of Ireland, may, perhaps, yet be worth the space they will occupy.

Both the average and extreme size attained by the atherine in the North of Ireland is greater than in the South of England.

Mr. Jenyns remarks that it is from 4, and Mr. Yarrell from 5 to 6 inches in length; any that I have seen in the collection of the latter gentleman barely reached this last size. As already mentioned with reference to Strangford Lough specimens, their average length was $6\frac{1}{4}$ inches, a few were 7, and one $7\frac{3}{4}$ inches long.

The atherine of the North of Ireland also differs from English specimens which I have seen, in being of a darker and consequently a less sandy colour. This difference is caused *above* the lateral line by the ground colour being darker, and by the small black spots being much more numerous: *beneath* the lateral line it arises from the former cause

alone. The general form, too, of the Irish is more elongate or less deep compared with its length than the English atherine.

A specimen from North of Ireland, examined in January, 1835, was as follows :—D. 7.15; P. 13 or 14; V. 6; A. 17; C. 18; B. 6.

Another specimen of 7 inches had, in D. 7.14 or 15—(the latter number, if 2 last springing from one base be reckoned 2)—P. 14; V. 6; A. 17; C. 18; B. 6.

Lower jaw of these fishes longer than upper; irides silvery.

1 D. opposite ventral fin; 2 D. opposite anal, excepting lateral line body diaphanous; when skin is taken off the lateral line a matter like silver tinsel appears; beneath that is a brownish coloured matter of fibrous texture (fibres extending lengthwise), and inside this again is a similar silver lining, scales easily detached, no scales on head, teeth very minute.

Specimen examined, May 14, 1835.—1 D. 8; 2 D. 1|15; P. 15; V. 1+5; A. 1+18; C. 18.

Specimen from Youghal, 5½ inches long, D. 7—1+13; P. 14; V. 1+5; A. 17; C. 17; a la Cuv.

Two specimens from the same locality—length of each, 4¾ inches.

1st specimen—D. 8 1+13; P. 14; V. 1+5; A. 1+16; C. 17.

2nd specimen—D. 8—1+13; P. 13; V. 1+5; A. 1+15; C. 17.

The following descriptions were noted by me on examination of three Irish specimens.

1st—Length 5½ inches; 1st D. 8; 2nd D. 1+14; P. 16; V. 1+5; A. 1+16; C. 17; two last rays in A. and 2nd D. from same base reckoned but as one. Length of head from point of under jaw to the edge of operculum, compared to the length of the body and tail, is very nearly 1 to 5; depth of body not equal to length of head, silver band placed rather lower on the body than in Mr. Yarrell's fish (as according both with his description and specimen). P. fins extended a little beyond the origin of the V. fin.

2nd—Length 6 inches; 1st D. 7; 2nd D. 1+12; P. 15 (distinct); V. 1+5; A. 1+15; C. 17.

Length of head to body and tail, 1 to 5, depth of body not equal to length of head; position of silver stripe differs very little from that described by Mr. Yarrell. V. originate in a vertical line with the ends of the P. fin rays.

3rd—Length 6¾ inches; 1st D. 8; 2nd D. 1+15; P. 15; V. 1+5; A. 1+18; C. 17. Length of head to body and tail is rather more than 1 to 5; depth of body not equal to length of head; scales much the same as in Mr. Yarrell's specimen. P. fin rays don't reach as far as origin of V.

Family GOBIADÆ.

THE GATTORUGINOUS BLENNY, *Blennius Gattorugine*, Mont.,

Has been taken on the North-East coast.

Templeton has thus noticed it in his Catalogue :—

"On the 22nd June, 1811, I received this little fish from Mr. M'Skimmin, who informed me he had procured it from the lobster traps, by the Carrickfergus fishermen, who declared that it was never taken but when the traps were laid in 12 or 14 fathoms water."

In the Ordnance collection are two specimens, one from Carnlough, the other from Port-Rush. Ordnance Survey, County Londonderry, "Notices," p. 14.

I have never met with this sp. on the shore or in rock-pools accessible between tide-marks where the *B. pholis* is so common; nor have I known it to be taken by dredging or trawling on our coast. The remark already made on the depth at which it is taken is interesting, and with my negative observations, indicate its being a deep-water sp. Mr. Couch too, I find, mentions it keeping "in the neighbourhood of rocks in water 4 or 5 fathoms' depth," on the coast of Cornwall.

YARRELL'S BLENNY, *Blennius Yarrellii*, Val.,

Has been obtained in one locality.

The only Irish specimens of this fish which I have seen are two which were taken by the collectors of the Ord. Surv. at Carrickfergus in May, 1839, and which were kindly submitted to my inspection by Colonel Portlock, that the species might be included in my Report on the Fauna of Ireland.

The following are my notes made upon examination of these fishes:—

1st specimen.—7½ inches, depth of body 1 inch. D. fin in height full half the depth of body; D. 52, in height very uniform throughout, but the 3 first rays somewhat the longest and adorned with filaments two-thirds of their length; 1st ray with its filament 13 lines long; next 2 gradually shorter; 2nd ray longer than 1st, but filament of 1st rather exceeding that of 2nd—it may not be perfect; 1 and 2 with filament may be reckoned much the same. A. 40. 1st ray very short, thence much of an uniform length till near the end, where they become rather large, the rays barely equal in length to the D.

P. 14; V. 3; C. 17 in all; some of the long rays reckoned as two apparently joined at bases. Anterior filaments 2 lines, posterior 5 lines long, Br. rays 5 on each side.

Between the eye and lip on each side is an appendage of 1½ line long.

2nd specimen.—Length 5½ inches, depth of body 9 lines. D. 52; A. 38; V. 3; P. 13; C. 18 in all, and as above. Br. rays 5 on each side. The larger fish is in colour darker throughout on body and fins than this.

An Orkney specimen given to me in 1840, being one of several taken under stones at Kirkwall Bay, Orkney, by Dr. Duguid, was 4¾ inches long; D. 54; filaments to anterior rays hardly perceptible though the fin is perfect. A. 39; V. 3; P. 14; C. 19 in all.

One of the best figures of Fish in Pennant's Brit. Zool. is of this species, under the name of Crested Blenny. The white base of the A. fin is well shown, and though not just so well, this colour is represented nearly as it appears in the D. fin. In the smaller Irish specimen these fins had much more of the white than in the larger.

In June, 1846, Professor Allman obtained a mutilated blenny, thrown up by the tide among sea-weed at Dalkey, which appeared to him to resemble this species more nearly than it did any of the others figured by Mr. Yarrell. Dr. Ball also examined the specimen, and was of opinion that it was the *B. Yarrellii*, but it was so much injured that he could not determine the species with certainty.

James Hill, a fisherman at Newcastle (County Down), on looking over the figures in Mr. Yarrell's British Fishes, informed me in October, 1851, that when searching for limpets he had seen this blenny among the sea-weed covering the rocks in that locality.

THE SMOOTH BLENNY, SHANNY, OR SHAW,* *Blennius Pholis*, Linn.,

Is common on the shore around the coast.

As stated by me in the Zool. Proc. 1835, p. 80,—

"This is more commonly to be met with than any other species of fish in the rocky pools [accessible at low water] on the North-East coast of Ireland." Templeton also noted it as "common in the little pools in the rocks along the shores."

I have examined specimens from all parts of the coast of Down, notes on fourteen of which are before me: the largest of these is 6 inches in length, one is 5¼ inches, and two others 5 inches each. The sp., as has been remarked (Yarr. 262), rarely exceeds 5 inches.

Sept. 16, 1835.—I saw many about an inch in length in very small pools of water near Donaghadee.

This fish is remarkably strong for its size, and when a person pursues one of them in a little gravelly pool, a large blenny will, with its strong head, sometimes come against the hand like the blow of a stone. Its energy in endeavouring to escape over moist gravel is surprising. Donovan notices this as "a very local fish," and states that where Pennant found it common about Anglesea, not one was to be seen 30 years afterwards. He attributed this to the *Fuci* having been cut away from that part of the coast, for economical purposes.

The fin rays in twelve smooth blennies from the Down coast examined by me were as follow:—

D. 30 in four, and 31 in all the other specimens.
P. 13 in all.
A. 18 in three, and 19 in all the others.
V. 3 in one specimen, and 2 in all the others.
C. 11 do., 13 in another, and 12 in all the others.

THE SPOTTED GUNNEL OR BUTTER-FISH,† *Muræenoides guttata*, Lacép., *Blennius Gunnellus*, Linn.,

Is very common around the coast at all seasons.

This fish is chiefly found between tide-marks sheltering under the sea-weeds (Fuci), hanging over and spreading around from large stones upon the beach, more especially if gravelly, over which the tide flows, but which at low water have but little moisture about them. Everywhere on the East, North, and West coasts that I have been, on a gravelly or shingly beach this sp. has been common. It wriggles its way with amazing speed among gravel, nearly moist, and even when captured can with difficulty be retained in the hand: the slime with which it is covered enables it to escape between the fingers.

At the end of March, I once saw a specimen which was dredged with oysters (from what depth I do not know) on the Derry coast and brought to Belfast; the fish was alive, though perhaps 24 hours out of the water.

The spotted gunnel is used as bait for pollack, cod, mackerel, gurnards, &c.; sometimes it is put whole and whilst alive upon the hook; but

* Called "Parrot-fish" in the South (Dr. R. Ball).

† Called *Clavin* in the North [also *Flutterick*, Ed.]. M'Skimmin applies the name *Codlick* to it; and the late Mr. Nimmo informed me that it is called *Lamprey* at Roundstone, County Galway.

it is also in some localities split up and the skin and vertebral column removed.

Of eight specimens from Down, respecting which notes were made by me, the largest was 6¼ inches in length. This individual had but 9 dorsal spots; the smallest examined (3⅜ inches) had 13; one other had 9; one, 12; and four of them had each 10 of these spots.

It is perhaps unnecessary to remark that the number of these spots has no reference to the size of the fish. The smallest specimens I have seen had as many spots as the largest; often more. One which I took on the Galway coast in July, 1840, 1¼ inch long, had 13 spots.

The fin-rays in two specimens which I examined were:—

1st specimen—D. 75; P. 10; V. 1 + 1; A. 1 + 39; 6.16?

First 5 rays of D. soft; remaining 70 spiny. Pectoral partly orange-coloured with several black dots.

2nd specimen—D. 75, all spiny; A. 42? first 4 spiny.

Capt. Fayrer, R. N., has sent me this species from Portpatrick.

THE VIVIPAROUS BLENNY, *Zoarces viviparus*, Cuv.,

Is said to have been obtained on the coast.

Templeton records "one specimen found on the coast of Down near Donaghadee."

I have not seen any Irish specimens of this fish, but when on a visit at Twizell House, Northumberland, in the Autumn of 1838, several were found at the beach near Bamborough Castle. They were sheltering under large stones between tide-marks, as we find *Blen. pholis* and *gunnellus*.

THE WOLF-FISH, SEA-WOLF, OR SEA-CAT, *Anarrhicas Lupus*, Linn.,

Has in a few instances been obtained.

Templeton says, in his published Catal., it is "sometimes met with in Belfast market." The only note which I have seen in his journal relates to one specimen obtained there on the 4th April, 1807. On questioning an intelligent man who has supplied the market here with fish for the last 25 years, and who regularly visits the fishing stations in Down and Antrim, I found that this species is quite unknown to him. In January, 1839, Dr. Jacob, of Dublin, informed me that he once procured a specimen which was taken off Dublin Bay. In the Museum of the R. D. S., I have seen a native specimen, as noticed in Zool. Proc. 1835, p. 80. Two were obtained from Dingle, by Dr. Ball.

Information which I received from Mr. Nimmo and Mr. M'Calla, relative to a fish which is sometimes taken on the Ling-lines, far out at sea off the coast of Galway, and which the fishermen call *Cat-Ling*, leads me to the opinion that it may perhaps be the *A. lupus*.

THE BLACK GOBY, *Gobius niger*,* Cuv. and Val.,

Has been taken on the western and southern coasts.

THE BRITISH BLACK GOBY, ROCK GOBY, OR ROCK-FISH, *Gobius Britannicus*, Thomp.,
(*Gobius niger*, recent British authors,)

Has been obtained both on the northern and southern coasts.

The following notices of the Irish specimens of black gobies, which

* Mr. M'Coy described a *Gob. fuliginosus*, in the 6th vol. of the Annals Nat. Hist. p. 403, that seems to me to approach very near this species.

had come under my inspection in and previous to the year 1839, have been already published by me :—

"Black Goby, Linn. ? Of the *black goby*, as generally recognised by British authors, a specimen taken at Youghal has been submitted to me by Dr. Ball. In a paper read before the Linnæan Society last year, I showed that the *Gob. niger* of Pennant and the fish to which Donovan applies the same name, are two distinct species. To the latter Mr. Yarrell has since given the name of *Gobius bipunctatus*."—*W. T.* in *Proc. of the Zool. Society*, 1835, p. 80.

"*Gobius Britannicus.* British Black Goby.

When at Galway Bay, on the western coast of Ireland, accompanied by Dr. Ball, in June, 1834, I captured a species of goby, whose thicker and more clumsy form at once led me to consider it different from a *G. niger* taken at Youghal, with which I had been favoured by that gentleman. On a recent examination it proved identical with the *G. niger* of Cuvier and Valenciennes, whilst the latter corresponded with the *G. niger* of Montagu (Yarrell's Brit. Fish. vol. i. p. 252) and Jenyns. This species is considered by Cuv. and Val., but without recourse being had to a comparison of specimens, to be the same as theirs; but the two individuals under consideration, unquestionably distinct, agree so well with the detailed descriptions of those just quoted under the same name, as to leave not a doubt upon my mind as to the propriety of separating them. Amongst other differential characters, they present the following :—

G. niger, Mont. (from Youghal).	*G. niger*, Cuv. and Val. (from Galway).
Jaws, the lower one the longer.	*Jaws*, equal.
Teeth, several irregular rows in both jaws, those of the outer row not very much larger than the others, and, like them, straight and truncated at the summit.	*Teeth*, outer row very much the largest, and curving inwards.
Sulcus, extending from the head to D. fin.	*Sulcus*, wanting.
Papillæ,* so numerous on the head as to give it the appearance of being delicately carved all over.	*Papillæ*, less numerous by half.
D. 6—14; P. 18; V. 1-5th each; A. 12; C. 15, and some short.	D. 6—16; P. 20—21; V. 5; A. 13; C. 14.

Though of British authors the *G. niger* of Montagu and Jenyns only is quoted with certainty, the species described as such by Pennant and Yarrell appears to be the same, the exceptions being that two rows only of teeth are attributed to it by the former, and 17 rays are described by the latter as contained in the second D. fin. The *G. niger* of Donovan and Fleming is the *G. Ruthensparii* (*G. bipunctatus*, Yarr.) of Euphrasen.

Bloch's *G. niger* does not agree with either species here treated of; as, like Pennant's, it is stated to have but two rows of teeth. It differs, more especially from that of British authors as now restricted, in the jaws being of equal length, the teeth pointed, and having 16 rays in the 2nd D. fin; and from that of Cuv. and Val. in the shortness of the P. fin, a character represented both in his figure and description. The *G. niger* of Risso hav-

* With respect to these resembling the *G. geniporus*, as described by Cuv. and Val., t. xii. p. 32, but very different in other characters.

ing the jaws equal, and the teeth curved, approximates it to that of Cuv. and Val., but the number of fin-rays differs considerably.

The species taken at Galway, which is new to the British catalogue, occurs also in the Mediterranean, the collection of fishes from Corfu, alluded to in the note to *Trigla pæciloptera* as being in the Belfast Museum, containing an individual in all respects, but that of size, quite identical.

Although the *G. niger* of Montagu and Jenyns accords better with the description of Linnæus—referring only to the number of fin-rays—than the species for which Cuv. and Val. have adopted his name, yet, as several other European gobies equally well agree with the brief characters in the Systema Naturæ, and it being necessary to give one of the two which have been confounded together a new name, it appears to me that the species described as *G. niger* in the Histoire Naturelle des Poissons of the last-named authors—the greatest and most comprehensive work yet attempted on the subject—should retain the term there given it, and that it is to the *Gobius niger* of British authors that the new appellation should be applied. With this view I propose the name of *Gobius Britannicus*, not to indicate its existence only on the British shores, but in the hope that it may perhaps, better than any other term, mark it as the species of British authors.

"As M. Valenciennes has observed that 'M. Yarrell a publié une charmante figure de *nôtre* gobie,' (t. xii. p. 18,) it must be added that this figure is more illustrative of my *G. Britannicus* than what I have considered the *G. niger* of Cuv. and Val.; all it indeed wants to be a perfect representation of that fish is the lower jaw a little longer, and the teeth smaller, less regular, and truncated." *W. T.* in Proc. of the Zoological Society, for 1837, p. 62.

"*Gobius niger*, Cuv. and Val.? and *G. Britannicus*, Thomp.

When recording a species of goby in 1837, as new to the British Fauna, I stated my opinion, judging merely from description, that it was the species described as *G. niger* by Cuv. and Val., Hist. des Poiss., t. xii. p. 9, and that it was at the same time distinct from the *G. niger* of Montagu, Yarr. Brit. Fish., vol. i. p. 252, and Jenyns, and probably from that of Yarrell. Of the former species I had then seen but the one native specimen—captured by myself in the bay of Galway—and therefore it was considered injudicious to draw up the specific characters. Having now obtained from Dr. R. Ball of Dublin two other specimens for examination—from the coasts of Galway and Cork—I can do so with more confidence. Although an easy task to point out the relative differences, it is not so with the absolute characters; these may be described as,

G. niger, Cuv. and Val.?	*G. Britannicus.*
Teeth on the outer rows of both jaws very much larger than the others, and curving inwards.	*Teeth* of the outer rows not very much larger than the others, and like them straight and truncated at the summits.
Scales small, with long cilia on their free margins.	*Scales* rather large.
D. 6–16; P. 20; V. 5 each; A. 13; C. 14, and some short.	D. 6–14; P. 18; V. 1 + 5 each; A. 12; C. 15, and some short.*

* The examination of more specimens has shown that there is but little disparity between these species in the dorsal sulcus and the comparative length of jaws, although a difference did, in these respects, appear in the individuals first

On comparison, the largest *G. niger*, Cuv. and Val., 3 inches 2 lines long, and the *G. Britannicus*, 3 inches in length, present the following appearances:—

Viewed from above, the head is more equable in breadth in *G. Britannicus;* in the other it approaches more to a conical form. When placed on the side, the *G. niger* is rather the deeper, carrying greater breadth to the base of the caudal fin; the scales are much smaller in *G. niger*, yet the *cilia* on their margins are longer than in the other: from some of the scales being wanting, their number cannot be accurately given; but, reckoned from the opercle in a straight line along the middle of the body—for the lateral line is inconspicuous in both species—to the base of the caudal fin, there are about 10 more in *G. niger* than in *G. Britannicus;* about 45 in the one and 55 in the other may be mentioned as an approximation: pecten-like striæ * on the scales of both species. In *G. niger* the outer row of teeth in both jaws is considerably the largest, and they differ entirely in form from those of *G. Britannicus*, this being the most obvious differential character between the species; of the large hooked teeth, there are about 16 in the outer row of each jaw; no teeth apparent either on vomer or tongue; † in addition to the very numerous card-like teeth in both jaws of *G. Britannicus*, the anterior part of the vomer is paved with them; on the tongue none are apparent.‡ The dorsal fins contiguous in both, the 2nd D. is obviously higher than the 1st in *G. niger* than in *G. Britannicus*, as in the latter the two or three longest rays are equal to the general length of those in the 2nd D., a size which they do not attain in *G. niger*. In *colour* these specimens differ considerably (but in this we need not look for constancy), the *G. niger*, from the general blackish or dusky hue of the body and fins (these much darker than in its congener), well meriting its specific name; along the base it is of a dull yellow (in other specimens pale lilac-grey); the general hue of the *G. Britannicus* is much lighter and more varied, the head, body above, and a short way beneath the lateral line marbled with yellow and brown, and points of black scattered along the lateral line; yellowish on the under parts."—*W. T.*, in Ann. Nat. Hist. vol. ii. (1839), p. 416.

In addition to the points of resemblance noted in foot-note to my paper in Annals, vol. ii., it may be mentioned that specimens received since it was written, and exhibiting the character of each of the two species, in teeth, present similar numerous lines of *papillæ* on the head, so that the difference before noticed seems rather an individual than a specific character. Both species are inhabitants of rocky shores.

Dr. Pat. Browne includes "*Gobius niger*, Sea Gudgeon," in his list of Irish Fishes, and Templeton notices it thus:—

"*Gobius niger*, Linn., a mutilated specimen on the shore of Belfast Lough, near Rockport."

M. M'Calla informed me that black gobies are common at Galway.

In the *Ordnance* collection (Dublin) are two specimens like Pennant's,

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compared (see Zool. Proc.). The jaws may in both be called equal. Of four specimens of *G. niger*, one had a more depressed line from the head to the first dorsal, another a broad groove, and the remaining two displayed neither appearance.

* See Cuv. and Val., t. xii. p. 12.

† Cuv. and Val. thus describe the teeth: "Chaque mâchoire a une large bande de dents en *crochets*, qui dépassent les autres, et dont on compte 18 ou 20 à chaque mâchoire," t. xii. p. 10. The similarity in the teeth chiefly led me to believe this species and mine to be identical.

‡ Montagu remarks of the teeth, that "the under jaw is roughened by them like a rasp." Mr. Yarrell describes the lower jaw "with fine carding-like teeth in several rows" (vol. i. p. 353). Mr. Jenyns notes "fine card-like teeth in several rows, the inner rows much smaller than the outer."—p. 385.

from Strangford, 1838, and one from Culdaff, Co. Donegal, 1839. Dr. Ball notes the black goby as found on the Dublin coast, but these have not been critically examined in reference to species.

The following notes were made by me on examination of my several specimens in April, 1846 :—

"Dr. Allman's *Gobius niger*, from Glendore (Aug. 1838), specimens given to me—Length, 4¼ inches; D. 6—13; P. 19; V. 5; A. 12; C. 15; and some short outer row of *teeth* largest and curving inwards. *Sulcus* (deep) from head to D. fin. *Papillæ* as numerous as in *G. niger*. Mont. (described by me)."

"An examination of two specimens of *G. niger*, Mont., from Tory Island (largest 3¾ inches long), with one (4¼ inches long) from Glendore, shows—

Jaws, no marked difference in.

Teeth of *G. niger*, Mont., rather sharp.

Sulcus broad in *G. niger*, Cuv., rather a depression than a sulcus narrow and deep, in *G. niger*.—Mont.

Papillæ no marked difference—numerous in both species."

"*Gobius Britannicus.*

1 specimen, Youghal (Zool. Proc., 1837).
2 — Tory Island (1845).
Seem this species in teeth."

"*G. niger*, Cuv. and Val.

1 specimen, Galway Bay, June, '34 (Zool. Proc., 1837).
2 — Coast of Cork, R. B. (Ann., vol. ii.).
1 — Glendore, Allman, seems this in teeth. See notes on it, and Tory Island specimens."

"*Gobius niger.*

2 specimens taken at Tory Island by Mr. Hyndman, Aug., '45.
3¼ inches long; No. 1, D. 6—14; A. 12.
P. 19; V. 5; C. 15; and some short. No. 2, D. 6—15; A. 12.
1st D. fin orange towards extremity, or upper 1/3 so; a narrow line of orange margining the 2nd D. In No. 1, the orange appears in the same places of both D. fins, but there is less of it than the smaller one. Sulcus from head to D. fins; Papillæ same as my *G. niger*."—*Mont.*
(See Proc. Zool. Soc., 1837, p. 62.)

THE DOUBLY-SPOTTED GOBY, *Gobius Ruthensparii*, Euph., *G. bipunctatus*, Yarr.,

Is common on the North-East coast, especially along the shores of Down, and is also abundant on the western coast.

In the Bay of Galway, on the western coast of Ireland, I took several specimens in July, 1834, in the course of a few minutes; they seemed to be quite abundant. During the following year Dr. Ball took specimens at the Island of Arran, which is probably the extreme western range of the species.

In 1834 I made a communication on this species to the Linn. Society, the following abstract of which appeared in the Phil. Mag., vol. v. p. 299:—

"It was remarked of the *Gobius niger*, from specimens taken in the North of

Ireland (on the shores of which country the species has not before been recorded as met with), that the fish so named by Donovan, with which these were identical, is distinct from the *G. niger* of Pennant, and as such ranks as a third species of *Gobius* to the British Fauna, two species only having yet a place in it."

Mr. Yarrell afterwards applied to this fish the specific name of *bipunctatus*.

This is a very handsome fish, not only from the blue markings along the side, and the large dark spots on sides of tail which give such an individuality to it, but from the fins being delicately mottled with brown or bronzed, and the dorsal having two or three light-coloured broadish lines throughout. The latter fins have much more beauty than Donovan represents.

Owing to their dark colour, these gobies are everywhere conspicuous (in which they wholly differ from *G. minutus*, and the other species found in sandy bays), and seem unwilling to venture far from their favourite fucus-covered rocks. Dr. Parnell's observations on this species (p. 88) quite agree with the preceding, made previous to the publication of his work.

As noticed in Charlesw. Mag., N. H., iii. 586, I obtained specimens from Portpatrick, through the kindness of Captain Fayrer, R. N.

Sept. 16, '35.—I remarked that this species was now much scarcer in the rock-pools in Ballyhome Bay, than I have found it there in winter.

June 22, '46.—A *Gobius bipunctatus* was found in a common tern shot to-day on Laithe Rock, Strangford Lough.

Mr. Yarrell's collection contains specimens similar to mine, which were taken by him in Poole Harbour.

The Freckled Goby, *Gobius minutus*, Pall.,

Is common on sandy shores, where it is found with the next two species, from North to South of the island.

I have seen specimens taken in various localities from the County of Antrim, along the eastern line of coast to Cork, inclusive, and Mr. M'Calla noted it as common on the coast of Galway.

Immature specimens I have found in abundance in sandy pools on different parts of the coast of Down, and I have obtained larger ones—3 inches long—by dredging in water several fathoms deep.

Templeton noticed the species in his catalogue thus:—"Several specimens, but not of greater length than 2 inches; stated to be common on the sandy shores, lodging under large shells when the tide is out."

I have seen this species display the rosy tint in the D. fin noticed by M'Coy in Annals Nat. Hist., vol. vi. p. 404, and in other characters so closely agreeing with the specimen there described, and considered to be *Gobius reticulatus*, Cuv. and Val., that I cannot consider them to be of two species.

The Slender Goby, *Gobius gracilis*, Jenyns,

Is found from North to South.

The subjoined notes upon this fish have been already published by me:—

"From the coasts of Down and Louth I have obtained two specimens of this fish. The difference in colour between them and *Gob. minutus* attracted me at first sight; but I did not examine further, until my attention was directed to

them by Mr. Jenyns' description of *Gob. gracilis*, with which they in all respects agree."—*Zool. Proc.*, 1837.

"Upon examination of eighteen specimens—seven from the coast of Down, six from Louth, and five from Cork—of the *Gobius* which until lately has been considered *G. minutus*, I found one individual from Down and another from Louth to be the *G. gracilis* of Mr. Jenyns (p. 387). These specimens are distinguished from those of the *G. minutus* by having the 'rays of the 2nd dorsal longer: these rays also gradually *increasing* in length instead of *decreasing*, the posterior ones being the longest in the fin;' and by having the 'rays of the anal in like manner longer than in the *G. minutus*;' also in 'the anal and ventral fins, which are dusky, approaching to black in some places instead of plain white, as in the *G. minutus*.' In addition to this difference in the colour of the fins, my specimens of *G. gracilis* have more black on the body generally than those of *G. minutus*, being so different in this respect as to have attracted my attention when they were first obtained."—*Ann. Nat. Hist.*, vol. i. p. 356.

"Dublin, June, 1838.—In the collection of my friend Robert Ball, LL.D., of this city, there are two specimens of *Gobius gracilis* about 3 inches in length, from Youghal. On closely comparing them with individuals of *Gobius minutus* of equal size, the differences in so far as they are above mentioned are very obvious; but further, as in those before examined, I cannot perceive any constant characters."—*Ibid.* vol. ii.

It should be mentioned that the A. fin, when lying close to the body, is black in these specimens.

THE ONE-SPOTTED GOBY, *Gobius unipunctatus*, Parnell,

Has been obtained in the North and South.

"I have obtained this on the North-East coast of Ireland; and in Dr. R. Ball's collection there is a specimen 3 inches in length, which was procured at Glendore (County Cork) by Dr. Geo. J. Allman. Although well-marked individuals of *G. unipunctatus* may appear specifically different from *G. gracilis* and *G. minutus*, yet from having remarked some specimens intermediate in character between the two first mentioned, I am led to doubt whether in these days of refinement the old *Gobius minutus* has not been multiplied into too many species."—*W. T.* in Ann. Nat. Hist., vol. v. p. 9.

In August, 1847, I received from Dr. J. L. Drummond a specimen of the *G. bipunctatus*, and also one of the *G. unipunctatus*, taken by him in the previous month of May, at Port-Bannatyne, Clyde.

THE GEMMEOUS DRAGONET, *Callionymus Lyra*, Linn.,

Is found occasionally on all sides of the island.

M'Skimmin and Templeton noted this species as having been obtained in Belfast Bay, where specimens have also been procured by Dr. Drummond, Mr. G. C. Hyndman, and myself. They are taken on long lines as well as in the dredge, and those of which I have notes were caught between the months of February and October, inclusive.

On 6th May, 1846, Dr. J. L. Drummond favoured me with the following communication:—

"This morning I got two specimens of *Callionymus Lyra*; life not quite extinct; they were taken on a long line in Belfast Bay, and are said not to be uncommon. Covered by the pectoral fin, there is on each side a very distinct ocellus of bright blue, the ring, however, not complete, but interrupted in some degree. The fins so collapsed that on a superficial view there seem to be only the ventral and caudal; ventral a dark brownish grey, not purple."

April 22, 1837.—Captain Fayrer, R. N., sent me a specimen of this fish which was taken at Donaghadee. Its length is 8 inches. D. 4—10; A. 10; C. 12 in all; P. 20; V. 1 + 5. Donovan's figure gives a very faint idea of the splendid colouring of this specimen. Below the eyes, on each side the head, the ground colour is orange, on which roundish and variously formed markings of "ultramarine" and "verditer blue," and similar beauteous shades of blue, prevail under the surface of head to opening of gill cover, the ground colour changes to gamboge yellow, and the blue becomes likewise paler, the ground colour of the anterior half of the back, *i. e.* to lateral line, is pale "arterial blood-red" (colours marked by inverted commas are from Syme), with pale fawn-coloured brown round spots and markings. Posterior half of back in ground colour, pale arterial blood-red, and brownish orange irregularly disposed with roundish spots, frequently confluent, of a pale fawnish brown, rather beneath the middle of the side (and below the lateral for ⅓ of its length from its origin) extends from operculum to tail a straight line of ultramarine blue, varying in breadth from 1-8th of an inch (at its origin) to 1-12th (at its termination); below this is a brownish orange stripe of twice the breadth of the blue, and beneath it is a line of "verditer" blue 1-12th of an inch in breadth, extending from the P. fin to the tail; when the fish is laid flat, or in the ordinary way, this line running straight along the base of its sides forms a beautiful terminal margin, touching the object on which the fish is placed. Pupil purple, irides silvery, but *in certain iridescent positions*, reflecting gold and brilliant flame colour.

1st D. fin, lemon colour, with irregular markings of pale blue, lined with a dark shade of blue.

2nd D., lemon colour, with 4 lines of pale blue, extending longitudinally throughout this colour, lined with darker blue.

C. fin marked with dull lemon colour and blue in about equal portions, the blue in longitudinal markings.

P. fin, first 10 rays barred with reddish brown and very pale olive, remainder dusky.

V. black, with a few blue markings towards base.

A. all dark smoke grey.

Base of Body—Throat black, thence to vent white with iridescent colours, when viewed in certain positions, thence to tail dull opaque greyish white.

"It was taken on the bank which extends from the Copeland Isles, southwards (called the Rig): it had just got the point of a large hook in its lip, on a long line."

February, 1849.—A beautiful specimen, presented to Belfast Museum by Patrick Doran, was taken off Mourne (County of Down), on the hook of a fisherman. It is 9 inches long. The 1st ray of 1st D. fin reaches, when lying on body, to base of caudal fin. It is considerably larger than 2nd ray of 1st D. fin.

The Sordid Dragonet, *Callionymus Dracunculus*, Linn.,

Is found from North to South, and probably around the island.

Its distribution and haunts are the same as those of the *C. Lyra*, both being inhabitants of deep water; it is, however, more common, although not of frequent occurrence.

This species was first noticed by me as Irish in Zool. Proc. for 1835, p. 81, in reference to a specimen forwarded to me by Dr. Ball, which had been obtained by him at Youghal, in August, 1834, being the first native ex-

ample that either of us had seen. It was taken in a sprat-net, and was endeavouring to bury itself in the sand when Dr. Ball observed it.

This specimen is 5 inches in length; D. 4—10; P. 20 or 21; V. 5; A. 10; C. 10.

The two posterior rays of the anal and second dorsal fins which I have enumerated differ from the other rays in those fins, in having a common base, and consequently might by some authors be reckoned but as one ray.

The first dorsal fin is so pale in colour as to be transparent as far as the second ray, thence to the extremity black.

Side line as described by Lacep.

The largest specimen of which I have a memorandum was taken at Holywood, in April, 1844; it measured 8¼ inches.

Mr. Hyndman captured one in a trawl-net at the depth of 27 fathoms off the mid-entrance to Belfast Bay, in August, 1850; and I have notes of others being caught on long lines baited with lug-worms, in the same bay, both in the summer and winter seasons.

A Newcastle fisherman informed me in Oct., 1851, that he occasionally takes this species, as well as that last treated of, on his long lines when set upon muddy ground, but never on sandy bottom.

Family LOPHIIDÆ.

THE FISHING FROG, ANGLER OR SEA-DEVIL,* *Lophius piscatorius*, Linn.,

Is common around the coast.

Fishes of this species are generally cut into on the N. E. coast, that the contents of their stomachs may be observed, after which they are thrown overboard, and are washed ashore. This accounts for their being so often seen lying dead on the beach. They are not eaten in the North.

Dublin, 1839.—Professor Allman states that the *L. piscatorius* is common on the S.W. coast of Cork, and is held in great detestation: when captured, the fishermen strike their heel into the posterior part of the skull, and then throw the *Lophius* overboard. They never cut into their stomachs as on the West coast to get the fish from them.

Nov. 13, 1841.—Dr. M'Donnell sent me three fresh examples of this species which were taken at Carrickfergus. In the pouches of all three were specimens of *Chondracanthus Lophii*: the stomachs of two contained the remains of small *Gadidæ*, which had been about 6 inches in length; that of the third contained the remains of a small sole or smooth dab, a whelk (*Turbo littoreus*), and a *Pagurus Bernhardus* of moderate size. Dr. M'Donnell was told by the person who sent him these fishes that he had lately taken five good-sized plaice alive from the stomach of a *Lophius*.

Colour of the three examples, "dirty" or dull brown above—of a different shade in each fish, the middle-sized one was, besides, marked over with small spots of a blackish colour; they were whitish beneath, but dusky towards tip of tail; lower portion of ventrals and pectorals the whitest portion of the fish, but both V. and P. black on the under side for about the last third; the little points of the extreme margin white.

December 7, 1841.—A fine specimen taken in Belfast Bay was brought to Dr. M'Donnell; its pouches were filled with *Chondracanthi*. Its total length was 4½ feet; unfortunately, parts were removed before I saw it, so

* This fish has various local names—*Frog-fish*, *Friar*, *Molly Gowan*, *Briar-bot*, &c. [At Strangford Lough it is called "*Kilmaddy*."—ED.]

that the whole weight could not be ascertained. I carefully weighed the ova in the very thin and transparent membrane enclosing them, and found them to be 1 lb. 13 oz. avoirdupoise. Each ovum was 1-32nd part of an inch in diameter, and after reckoning how many of these were in a drachm, and making due allowance for the weight of the membrane and glutinous fluid in which they were placed, I estimated the total number of ova to be 1,427,344.

February, 1843.—I am informed by the Rev. J. M. Black that when trawling in Belfast Bay he has frequently taken large *Lophii*, and has always found the food in their stomachs to be *skate*, of which he has, to his astonishment, seen specimens a yard long. He describes the *Lophii* containing these as remarkably large.

August 19, 1844.—A gurnard, 5 inches long, was taken from the stomach of a *Lophius* about 10 inches in length, captured in Belfast Bay, by Mr. G. C. Hyndman.

January 1, 1847.—Mr. Darragh, curator of the Belfast Museum, was told by a trustworthy man at Larne Lough, that in one of these fish, which he found dying at the edge of the lough, there was an entire female widgeon perfectly fresh. Another person in the same locality, seeing one of these fish in a dying state, and having observed the tail of another fish protruding out of its mouth, cut the *Lophius* open and found in it seven mullet, of which three were alive: the whole seven weighed from 3 to 4 lb. each.

A story is told at Youghal of a living widgeon being taken out of the stomach of one.—*Dr. Ball.*

I have been informed that the *Lophius* is frequently killed in a singular manner at Keem in Achil. The waves, on receding, carry back quantities of sand, which, getting into these fishes' mouths, disables them, and, being thus seen from the shore, they are, in their extremity, approached and despatched with pitchforks.

Mr. W. Todhunter once saw a *Lophius* in shallow water near the shore at Youghal, and presented the butt-end of a whip to it, which it seized and held by, until thus drawn ashore.

A similar case is recorded by Dr. Parnell (p. 96). Some years ago it was mentioned in the Dublin newspapers that a man bathing in Kingstown in that neighbourhood was seized by a *Lophius*, and so injured in the leg, that he had to be taken to an hospital, and suffered from the wounds for a considerable time. The fish was said to have been captured, so that there was no doubt of the species.

Family LABRIDÆ.

THE BALLAN WRASSE OR GREEN-STREAKED WRASSE,*

Labrus variabilis, Thompson,
— *maculatus*, Bloch,
— *lineatus*, Donovan,

Is the most common of the *Labridæ*, and found around the coast, where of a rocky character. *All* the wrasses are partial to rocks, in which respect they differ from the gobies; some of the latter prefer sands, although others do not.

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* Called "Bavin" on the North-East coast; "Morrian" and "Murranroe" near the Giant's Causeway. [Also called "Gregagh" in the North.—ED.]

The following notes which I contributed to the Zool. Society in 1837 were published in the Proceedings of that year:—

"*Labrus lineatus*, Don., *Lab. maculatus*, Bloch, *Lab. psittacus*, Risso?—On September 26, 1835, I obtained at Bangor, Down, two specimens of a *wrasse*, which agreed pretty well with the *L. lineatus* of Donovan, a species but little understood. They seemed also identical with the *L. psittacus* of Risso, used as a synonym of the *L. lineatus* in the works of Mr. Yarrell and Mr. Jenyns; by the latter author it is marked with doubt. At the same time I could not consider these specimens else than the young of *L. maculatus*, an opinion which subsequent examination has tended to confirm, as in the same individual I have seen the lineated marking of *L. lineatus* and the spots of *L. maculatus*. The specimens alluded to as corresponding with Donovan's *L. lineatus* are small, as he describes the species to be: those conspicuously spotted over were large, and the individuals presenting partially both appearances were of an intermediate size; hence it would appear that the *L. lineatus* generally* is the young fish, and the *L. maculatus* the adult. It must be added that specimens of equal size, taken at the same time and place, vary much in colour and in the relative depth of the body. The head, too, is more elongated in the young than in the mature fish."

In concluding his description of the *Labri* Pennant observes,

"Besides these species we recollect seeing taken at the Giant's Causeway, in Ireland, a most beautiful kind, of a vivid green spotted with scarlet; and others at Bundoran, in the County of Sligo, of a pale green." He adds,—"We were at that time inattentive to this branch of natural history, and can only say they were of a species we have never since seen."

I have no hesitation in saying that the beautiful kind of a vivid green, spotted with scarlet, was the ordinary *L. maculatus*, and as little in stating my belief that the pale green kind was also the same species. On examining the produce of one rod after a day's fishing, I have seen specimens varying from the palest green to the very darkest tint of this colour.

As the three names under which this fish appears—viz. *L. lineatus*, *L. psittacus* (when it is uniformly green), and *L. maculatus*—apply to the individual rather than to the species, and thus tend to confusion, it seems to me desirable that there should be an appellation under which all the varieties could be brought, and as such I would suggest *Labrus variabilis*.

Templeton, M'Skimmin, and Marshall have each noted the occurrence of *Labrus Tinca* in the North of Ireland, but I have little doubt that they referred to red-coloured specimens of the Ballan wrasse, which is sometimes of a rich pure green colour.

The stomachs of two of these fishes, which, in company with Dr. J. L. Drummond, I examined in September, 1836, contained only the remains of shrimp-like crustacea, with the exception of an imperfect specimen of *Turbo quadrifasciatus*. The gastric juice had almost entirely consumed one of the stomachs. I remarked that wherever these specimens had been rubbed by the pectoral fins or otherwise, the colour was much more faint than elsewhere.

Mr. B. Meenan informs me that the Ballan wrasse is very abundant at Donaghadee, where it attains the weight of 8 lbs. It is little prized in Belfast market, the largest being sold for a few pence.

During an easterly gale in February, 1838, numbers of these fishes,

* I have seen some specimens of the largest size entirely green, and displaying the lineation in a darker shade of this colour.

perhaps five hundred, and no other fish, were thrown up dead on the shore near Holywood.

Mr. M'Calla supplied me with the following note in reference to the *Labrus maculatus*, on Galway coast :—

"In carefully reading the description of this species in Yarrell's British Fishes, I perceive a few particulars at variance with its habits here, with regard to the large and small individuals not being found together. I have taken specimens of the *Labrus Tinca* and *L. maculatus* about 4 inches, while men in the same boat were taking some weighing upwards of 4 lbs. In England, it seems, the fish is not relished; here it is the most favourite fish, the entire of the boats being engaged fishing for them. With us they do not spawn until June. Looking over some thousands in a day, I have observed invariably that the larger the specimen the more beautiful the colours. This species is subject to great variation in its colouring, but a person situated as I am here can perceive a general similarity in the markings of the different sizes, as you have noted in your paper on the *Crenilabri* that the *C. Cornub.* was less brilliant in colour than the *C. Tinca*. Are these the young, those the adult? I remain positive of the *L. maculatus* being more brilliant in the mature than in the young state. I have never seen so splendid a fish as this, when caught about 4 lbs. weight. I have observed that the colours of the species of this genus do not disappear after death, as is the case with many other fish, as I have seen them retain them well for a number of days, in some cases when the fish was even putrid. The middle size of this species is generally of a reddish colour, but without the beautiful spots of the largest size. Notwithstanding the habits of this fish, it is found covered with Lernea; one brought in to me this day alive in a pot had some hundreds on it; they were the most active species I have ever met with, running over the fish with astonishing rapidity. I have never found any attached to the gills. I cannot omit mentioning about the mode of fishing for this species; the boats choose a sunken rock often with 30 fathom water; and, as it is what they term *foul* ground, they use a stone for an anchor, so that if it fastens they will suffer no loss. In like manner for their lines, instead of lead they use a small round stone, tied weakly to a line, so that when it fastens it will break off and not endanger the line; they bring a great number of stones to sea with them for this purpose. In fine weather they often go 12 miles to sea fishing for this species, which is a favourite fish. It is caught by day."

[The following descriptive notes were made by Mr. Thompson some years ago, but there is no date on the MS.—Ed.]

K. Green Wrasse, *Labrus maculatus*, Bl. The following notice is of five specimens of a species of *Labrus*, the general colour of which (body and fins) is rich green in all, though they have been stuffed for a few years. They were all taken in Larne Lough, and presented to Belfast Museum by Mr. Wm. Marshall.

1st, length 19 inches.

B. 5? D. 20|12 (two last touch at base); P. 15; V. 1|5; A. 3|9; C. 17?

This seems to be the *L. lineatus* of Donovan; it is (body and fins) of a rich green colour, which becomes paler in the under parts. This colour has been described to have been admirably well retained in the present specimen. As in Donovan's dried one, it also possesses the longitudinal lines represented in the figure of that author.

2nd, length 11 inches.

D. 20|11; P. 15; V. 1|5; A. 3|9; C. 15, well developed.

3rd, length 10½ inches.

D. 20|11; P. 15; V. 1|5; A. 3|9; C. 15, well developed.

This specimen is green, like the previous two, but has also singularly disposed transverse markings, in a zig-zag form upon the back and sides.

4th, length 20 inches.

D. 20|11 (two last touch at base); P. 15; V. 1|5; A. 3|9; C. 15, well developed; B. 5?

The opercula and sides above lateral line in this specimen are beautifully marked, being covered with roundish green spots from 2 to 4 lines in diameter each, surrounded with an irregular ring of a brown colour; below the lateral line this marking appears but in a faint degree, the sides, from the extremity of pectoral fins to tail, being regularly lineated as in Donovan's figure.

5th, length 19 inches.

D. 20|11 (two last join? at base); P. 15; V. 1|5; A. 3|9 (two last touch at base); C. 15, well developed; B. 5? base of operculum of a dark orange colour, with pale green spots of a roundish form.

The rays in branchiostegous membrane in this specimen, and in Nos. 1 and 4, are marked 5? as this number only appears; and, from the specimens being stuffed, it cannot be stated whether there be more. Pennant gives four as the number in that of the Ballan wrasse.

With Pennant's description of Ballan wrasse these five specimens agree in the number of fin-rays, and also in possessing scales between the rays on the caudal fin (these scales do not appear on any other fins); with the same description they do not agree in colour, in considerable sinking between D. and C. fins (this cannot perhaps be judged of in stuffed specimens), nor in depression of gill-cover radiated from the centre (no such appearance being visible).

In fin-rays these agree with *L. Neustrica* of Lacepede. He does not mention the colour, &c.

[Two other specimens presented by the same gentleman to the Belfast Museum were thus noted by Mr. Thompson.—Ed.]

1st specimen, 14½ inches in length; D. 17|14 (reckoning two last, which touch at base, as 2); P. 15; V. 1|5; A. 14, total number; the three anterior rays are spiny, next two or three broken at point. C. 14. Furrow from snout to forehead is not so well marked as in the specimens of green wrasse which I have examined.

Colour.—Anterior portion, or nearly a third of dorsal fin, black; also the posterior half of tail, the extremity of anal fin, and of the two or three anterior rays of ventral fins.

2nd specimen, 14 inches in length; B. 5, distinctly seen; D. 18|13; P. 15; V. 1|5; A. 3|11; C. 14; greater portion of tail towards the extremity, about ⅓ of the anterior portion of dorsal extremity of anal and of the three anterior rays of ventral fins, black; the pectoral fins, I should think, were on both specimens clouded with black.

One of Dr. Ball's specimens from Youghal, 21 inches long, has the lineated appearance strongly marked.

The following are the dimensions of a fish called *Red Bavin* by the person who preserved it, on account of its prevailing red colour. This has, however, entirely disappeared since the specimen was stuffed.

Length 16½ inches.

D. 21|11; P. 1|5; V. 15; A. 3|9; C. 15; B. 5. This fish is now of

a very faint green colour. It is evidently the same species as the green wrasse.

"Variable Wrasse—*Labrus variabilis*, Thomp.—*Lab. maculatus*, Bloch—I have seen taken commonly on the rocky coasts of Wigton and Ayrshire. It seems common in such localities around the British Islands."—*W. T.* in *Mag. Nat. Hist.* vol. iii. p. 586.

THE COOK WRASSE,* OR BLUE-STRIPED WRASSE, *Labrus variegatus* (Gmelin),

Is occasionally, but rarely, taken around the coast.

Localities noted:—Coasts of Antrim and Down; Dublin, Ardmore, in County Waterford, Youghal, and Kilkee (Dr. Ball); Galway coast (Mr. M'Calla).

The first published notice of this specimen as Irish, was communicated by me to the Zool. Proc., 1835, (p. 81,) where it was stated that the specimen is occasionally taken on the Down and Antrim shores; that a specimen had been sent me from the South by Dr. Ball; and that, in the museum of the Royal Dublin Society, one is preserved which was purchased in Dublin market. I subsequently learned, however, that the specimen had been known to Mr. Templeton, and in his published catalogue, which afterwards appeared, the following note occurs in reference to it:—"Both the specimens of this beautiful fish were caught in Strangford Lough."

The food contained in specimens which I examined, consisted of mollusca and crustacea.

Like other rare species not known to the public, this wrasse does not meet with purchasers in our northern markets.

Descriptive notes of two specimens taken at Carrickfergus, December 28, 1835:—

1st, length 11 inches.

D. 17 + 13; A. 3 + 11; P. 15; V. 1 + 5; C. 15, well developed; B. 5.

2nd, length 11 inches.

D. 18 + 12; A. 3 + 12; P. 14; V. 1 + 5; C. 15; B. 5.

Colour of both specimens—one-half of the upper portion of the body, including operculum and pre-operculum, greenish olive beautifully striped, and otherwise marked with different shades of brilliant blue (iris blue and golden orange), the blue extending in one specimen conspicuously, in the other faintly, along the middle of the body (not occupying more than about 1-5th of it) to the base of tail; remainder or all the rest of the body different shades of orange, which is deepest in tint on the back, and becomes gradually lighter towards the belly.

D. fin rather more than ¼ of anterior portion azure blue to near the tips, which, with the remainder of fin, is orange, excepting the extremest tips, which are blue.

P. entirely of a very pale red, transparent.

V. very pale orange, tipped with pale blue.

A. yellow orange for 2-3rds from base, remainder greyish blue.

C. about the basal half orange red, remainder Prussian blue.

The stomach of the one contained only a piece of the "buckie whelk," with which bait it was, I presume, caught. The stomach of the other was

* Sometimes called "Livery Servant," and "Livery Fish" in the North.

empty, but the œsophagus contained also a large piece of the same mollusk. One side of the gill membrane was torn out in both specimens, probably in extricating the hook.

The following was a female fish, the ova extremely minute:—

July 9, 1838.—I received in a recent state, from C. G. M. Skinner, Esq., a specimen of *L. variegatus*, which was taken in a lobster basket on the 7th inst., at Portmuck, Island Magee, and was quite unknown to those who saw it there.

Its length is 10 inches; Br. 5; D. 17 + 13; A. 3 + 11; C. 15 (well-defined rays); P. 15; V. 1 + 5.

In colour this specimen is extremely beautiful, and much less gaudy than others I have seen. The entire head and 2-3rds of the upper portion of the sides has bronze of different shades for a ground colour, and throughout this the beautiful azure markings as in form, though in colour faintly represented in Donovan's fig. 21; the lowest 1-3rd of the sides to the V. profile is rose red, of different shades (the blue markings are more broken and varied than in Donovan's fig., not exhibiting any formality as in his); the D. fin is marked and coloured as by Donovan; but the colours all very much richer. The C. fin is rich dark red, terminated by azure, which is very narrow in the centre, but both above and below extending to a narrow point near to the base of the outer rays. Several azure spots upon the red centre of the fin (no formal band as in Donovan ending this fin). P. fins uniformly violet red (no formal band as in Donovan's). V. fins pale orange red, tipped with azure; A. fin of a much deeper red than the rose-coloured body at its base, and terminated by azure, which becomes pale at the extreme margin.

Irides dull silver, variegated with blue, orange, and yellow.

January 2, 1845.—I bought a fresh specimen taken at Larne; length, 10½ inches. It is a most brilliant specimen, nearly the anterior half being golden olive, on which blue of the most beautiful colour appears. Immediately behind the gill-covers are what Pennant might have called four parallel lines of greenish or (rather) golden olive; but only the two upper I should call lines with one line of blue, it being broken instead of linear, except where it first appears, the blue taking other forms.

A similar marking of head to that described in *L. trimaculatus* taken with it is presented, *i. e.* a blue bar across top of head between eyes, and a horse-shoe formed, or rather in this specimen a belt of lovely blue before this across snout, and reaching down below the line of lower point of eye, which it does not do in *L. trimaculatus*. Its back (hinder) is brilliant orange red, belly intense gamboge yellow, the adjacent fins partaking respectively of these colours.

Irides brilliant red and deep blue, hinder half of caudal fin brilliant blue, but darker than the most beautiful blue on the D. P. and A. fins; all the shades of blue in this fish are extremely beautiful.

Yarrell's description is good, but "striped" with blue indicated a formality in the dispositions of this colour not presented in the present specimen. It is broken into somewhat triangular sections, rather of triangular forms, excepting one or two stripes.

May, 1847.—*Labrus variegatus* (taken with *Labrus trimaculatus* at the Wheelan's, near Larne) was the largest I have seen. It measured 13 inches in length; body, exclusive of fins, 3 inches deep, colours extremely beautiful.

A *Labrus*, agreeing quite as well with *L. vetula*, described by Jenyns and Yarrell, as with *L. variegatus*, described by the same authors, was

sent to me in a dried state by Dr. Ball, in December, 1835. On comparing it with Mr. Yarrell's specimens in London, I considered it *L. variegatus*.

May not Bloch's *Labrus vetula* be *L. variegatus?* There is only *colour* against it, and this is nothing, unless he describes from recent specimens.

The Three-Spotted Wrasse, *Labrus trimaculatus*, Penn.,

Has been obtained on the North and North-East coasts, and also in the West.

The first native specimens of this fish which I saw were taken at Portrush, near the Giant's Causeway, by the collectors to the Ordnance Survey.

January 2, 1845.—I bought two fresh specimens of this fish which were taken at Larne along with a *Lab. variegatus*. They are 9 and 10 inches long each; their colours agree with Yarrell, p. 321; but it may be added that the anal fin is broadly edged with pale blue, of which colour there is a narrow edging to the dorsal and caudal fins likewise.

On the top of the head there is a stripe of dark blue from eye to eye, and a horse-shoe mark across the snout of the same colour before the eyes, towards which the points are directed. Eyes deep brilliant red, a stripe of dark blue across the upper portion, and a little of it below the pupil.

The smaller specimen has four conspicuous black spots on dorsal ridge; anterior to the first there is *not* a white spot, though, as usual, white spots are before each of the other blackish ones.

On mentioning the occurrence of these fish to my friend, Dr. Drummond, he stated that when at Donaghadee, in the summer of 1843, he saw three full-sized specimens of the three-spotted wrasse, taken in the month of June; and one taken in July was sent him to Belfast by Lieutenant Davy, R. N.; they were taken by boys fishing from the rocks.

In Donovan's beautiful figure of this specimen (pl. 49) the D., A., P., and V. fins are represented as being tipped with blue, but this colour does not appear elsewhere. It would seem that the author had seen but the one specimen.

In the collection of the Royal Dublin Society there is an example procured by Mr. M'Calla, at Roundstone. A specimen taken at the Wheelan's, near Larne, in May, 1847, was sent to the Belfast Museum. It measured 11 inches in length, and was taken with "white bait."—*Nerei.*

M. Agassiz informs me that *L. carneus*, Risso, of which he possesses a specimen so named by that author, is a distinct species from the *L. carneus*, Bloch; this latter being identical with *L. trimaculatus* as figured by Donovan.

The Gilthead, Corkwing, or Gibbous Wrasse,

Crenilabrus Tinca, Flem.,
— *Cornubicus*, Risso,
— *Labrus Cornubicus*, Penn.,
— *gibbus*, Flem.,

Is found around the coast, and is, next to the Ballan wrasse, the most common species.

In the Zool. Proc. for June, 1835 (p. 81), I noticed the *C. Cornub.* as

taken at Youghal by Dr. Ball, and I subsequently made the following communications to the Zoological Society, and to the Magazine of Zoology and Botany:—

"*Crenilabrus Tinca*, Risso. *Cren. Cornubicus*, Risso. *Cren. gibbus*, Flem In the autumn of 1835 an attentive examination of specimens of the *C. Tinca* and *C. Cornubicus*, of all sizes, and in a recent state, satisfied me of their identity. The depth of *C. Tinca* in proportion to its length being found to vary considerably, though not to the extent described in the *Gibbus Wrasse* of Pennant, together with the general accordance of other characters, disposed me at the same time to believe that the *C. gibbus* is but an accidental variety of it."—*Zool. Proc.*, 1837.

"CRENILABRUS TINCA and C. CORNUBICUS of Authors.

During the month of September, 1835, which I spent at Bangor, on the coast of Down, I embraced the opportunity of examining these species in a recent state, as on every calm day they were in about equal numbers caught from the rocks by lads, who provided me with them.

This examination proved to my satisfaction that the *C. Tinca* and *C. Cornubicus* are not distinct. The *colour* was as commonly described, in so far that the smaller specimens,* up to the length of six inches,—but not all under this size,—had on the body at the base of the caudal fin the black spot of *C. Cornubicus*, and the larger (*C. Tinca*) wanted it; also, in the former being generally rather less brilliant in colour. Some specimens of an intermediate size, however, had the above-named spot of an obscure brown, suggesting that this spot, originally black, may change gradually to this colour, and afterwards become obliterated—an effect analogous to which, but to a much greater extent, takes place, according to Agassiz, in certain species of the *Salmonidæ*. The dorsal fin was similar in all, the spinous portion being marked alternately with longitudinal lines of green and red, and the soft portion red, with roundish green spots. In no other marking or distribution of colours was there any difference between them.

In not one of the many characters which come under the head of '*form*' was there any difference; the proportion of depth to length, denticulations of pre-opercle and teeth,† being similar in both. In these characters Mr. Jenyns considers the *C. Tinca* and *C. Cornubicus* differ (Man. Brit. Vert. p. 398), and from his great accuracy there cannot be a doubt that they did so in the specimens he examined; but it was, I presume, merely individual, as the differential characters he has assigned to each have occurred to me in the other.

Dr. Fleming has brought these species together (Brit. Anim. p. 208); but we are not informed whether it was their general similarity, or an actual examination of specimens, that led him to this conclusion.

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* In the collection of Dr. Ball, of Dublin, there are smaller specimens than any obtained at Bangor. Ten of these which I examined, and of which several were about $1\frac{1}{2}$ inch long, had the black spot conspicuous. The largest individual I have seen with this marking is $8\frac{3}{4}$ inches in length. It was procured on the northern coast of Ireland in the course of the Ordnance Survey.

† In two Bangor specimens of *C. Cornubicus* there are fourteen teeth in the lower jaw, a greater number than which is not possessed by any *C. Tinca* I examined with them. The second row of teeth in the upper jaw is most apparent in the larger individuals, or, in other words, in *C. Tinca*.

Mr. Couch remarks of *C. Tinca* and *C. Cornubicus* (Mag. Nat. Hist. vol. v. p. 742) that they differ in size, shape, colour, and habits. The three first differences have been already dwelt upon; but as to habits, I have only circumstantial evidence of their similarity, by the supposed two species being taken in like quantity at the same time and place, and with the same bait. The *C. Cornubicus* is, under the name of 'Corkwing' admitted by Mr. Couch occasionally to want the black spot on the tail (Mag. Nat. Hist. vol. v. p. 18), and is in this state considered by him to constitute the 'Gibbous Wrasse' of Pennant. I, believing the *C. Tinca* and *C. Cornubicus* to be identical, am inclined to think the gibbous wrasse is an accidental variety of *C. Tinca*. The only thing like a specific difference that I can perceive in any of the characters included under '*form*' in the *C. gibbus*, is its greater depth, which is to its length as three to eight—the average depth of *C. Tinca* I find to be as three to nine, and the proportion varies—though certainly not, so far as I have observed, according to any peculiarity of colouring, which is supposed to mark *C. Tinca* and *C. Cornubicus*. The only difference between them in *colour* worthy of remark is, that *C. gibbus* has a 'dusky semilunar spot *above* each eye,' and the 'pectoral fins marked at the base with transverse stripes of red.' The *C. Tinca* has a 'dusky' mark *behind* the eye, which does rarely reach above it posteriorly, and amongst my specimens is one exhibiting three transverse stripes of red at the base of the pectoral fin, though all the others have but one stripe. Finding specimens of the *C. Tinca* thus varying both in form and colour, I have not a doubt of the *C. gibbus* being an accidental variety of it, an opinion which is much strengthened by one individual only of *C. gibbus* proper having ever occurred. With these views, it appears to me that the name of *C. Tinca* should be used to designate the species, and *C. Cornubicus* and *C. gibbus* to mark its varieties. This species, in its ordinary aspect, and in that of the variety first mentioned, probably occurs on all the rocky parts of the Irish coast. I have seen specimens of both from a wide range of the northern, eastern, and southern shores.

Since the above was read to the Zoological Society, I have observed in the collection of my friend, Dr. Ball, a fish named by him *C. gibbus*, which further serves to illustrate what has been just advanced. This specimen, which was taken at Youghal, is in length 8 inches, its greatest depth of body, exclusive of fins, 2 inches, 7 lines—the depth to length thus being as 1 to $2\frac{3}{4}$.—The fin rays are:—
D. 16+9; A. 3 + 10; V. 1 + 5; P. 15; C. 15, and some short. Its profile from the mouth to the commencement of the dorsal fin is even more vertical than represented in Pennant's figure of the gibbous wrasse, but here, instead of about the centre of this fin, is its maximum height. From this point it falls away gradually to the tail, so that, without including the dorsal fin, it does not present the depth relatively to the length described by Pennant. It is at the same time evidently his *C. gibbus*, and as evidently a mal-formed specimen of *C. Tinca*. The original colour cannot now be accurately determined. It, however, wants the black spot of *C. Cornubicus*."—*Mag. Zool. and Bot.* vol. ii.

Mr. Yarrell, in his first edition of British Fishes, gave a figure and description of *C. gibbus*, but it is left out of the second edition of the work, without, so far as I can perceive, any allusion to the circumstance, or any reason being assigned for its omission.

June 10, 1838.—At Kingstown (Dublin) I saw a boy with a string of

fish, consisting of *Labrus maculatus*, *Crenilabrus Tinca*, and its variety *C. Cornubicus*, showing no difference but the black spot on the tail.

Mr. *M'Calla*, in 1840, mentioned *C. Tinca* and *C. Cornub.* as frequent at Roundstone. He added, "I have taken a number of *C. Tinca* of small size, without the black spot and brilliant colour; I have specimens three times the size with the black." I have never known this species brought to Belfast market.

A specimen of *Crenilabrus Cornubicus*, in possession of Dr. Ball, was as follows:—

Length 1 inch 9 lines.

D. 16 + 9; P. 14; V. 1 + 5; A. 3 + 10; C. 14, and some short; coloured as in Donovan's plate.

It was taken at Glendore, County Cork.

The fin-rays of two of the specimens which I procured at Bangor, in September, 1835, were thus noted in my journal:—

C. Tinca, seven inches long.—Fin-rays, D. 16 + 10; P. 14; V. 1 + 5; A. 3 + 10; C. 13, well developed rays.

C. Cornubicus, six inches long.—Fin-rays, D. 16 + 9; P. 14; V. 1 + 5; A. 3 + 10; C. 13, well developed rays.

JAGO'S GOLDSINNY, *Crenilabrus rupestris*, Selby,

Has been obtained on the North-East and West coasts.

CRENILABRUS RUPESTRIS* (*Lutjanus rupestris*, Bloch), Jago's Goldsinny.

On the 10th and 13th of September, 1835, I detected two specimens of this fish at Bangor (County Down), amongst a number of the *C. Tinca* and *C. Cornubicus* that were taken by boys fishing from the rocks, and using as bait a species of *Nereis*, apparently the *N. rufa* of Pennant. The following short description, drawn up from them when recent, may not be unacceptable, as the species is subject to much variation. Total length 4½ and 4¾ inches; number of fin-rays:—

D. 17 + 9; P. 14; V. 1 + 5; A. 3 + 8; C. 15, well developed; Br. 6.
D. 18 + 9; P. 15; V. 1 + 5; A. 3 + 8; C. 15.

Depth equal to length of head; head to length of body nearly as 1 to 3; lateral line taking the precise form of dorsal profile. A row of pores appearing near the margin of the pre-opercle is continued forward over the eye. Behind its upper portion they are numerous, and irregularly disposed. Caudal fin covered with scales for two-thirds of its length from the base, none upon the dorsal and anal fins, their base being concealed by the scales of the body. Colour above the lateral line greenish-brown, below it changing gradually to pale green, the colour of the belly. Some irregular rows of orange spots occur longitudinally beneath the lateral line. Pectoral fins orange-yellow, which colour, with lighter shades of yellow, prevails in all the fins, except the anterior portion of the dorsal, which from the first to the fourth ray is black; of this colour also are the upper margin of the eye and orbit, and a roundish spot at the upper edge of the tail. The centre of the scales, being of a rather darker shade than their margin, gives to these specimens the appearance of being faintly lineated.

They seem to be identical with the species represented in the vignette

* See Mr. Selby in Mag. Zool. and Bot., vol. i. p. 170.

to *C. luscus*, in Mr. Yarrell's British Fishes (vol. i. p. 301),* though certainly not with the figure preceding the article, nor with the description of *C. luscus*. The vignette differs from them in the mouth, which is placed too high, and is thus made unnaturally to resemble that of the *Trachinus vipera*.

Such were the observations made on these individuals in a recent state. In the month of February, 1836, a specimen of the same fish, which was cast ashore at Barncleugh, came into the possession of P. J. Selby, Esq., and formed the subject of a communication to the Magazine of N. H. in the following August. Mr. Selby here satisfactorily showed that it was the goldsinny of Jago and *Lutjanus rupestris* of Bloch, but of a different species from the fish now known by the former name. My specimens had not the least indication of transverse bands on the sides, as described and figured by Bloch and Selby, nor was there any appearance of blue either in spots or lines upon the head. On examination of several individuals in Mr. Yarrell's collection, I found no appearance of tranverse markings. Nilsson observes (Prod. Icht. Scand.) that the colour of the species is variable.

A specimen of this fish, obtained by Dr. J. L. Drummond when dredging about the entrance to Belfast Bay, in June, 1838, measured 4¼ inches in length; fin-rays, D. 17 + 9; P. 14; V. 1 + 5; A. 3 + 7; C. 15, well developed.

The following is an extract from a letter which I received from Mr. M'Calla, dated at Roundstone, Oct. 3, 1840:—

After stating that he had procured one of these fishes, Mr. M'Calla added—"I have carefully studied your description in vol. ii. Mag. of Zool. and Bot., and Selby's account in the 1st vol. I beg to offer a few remarks on the specimen I obtained; first, as to length, not having a rule at hand, I mark the length of the specimen [4⅜ inches.—Ed.]. Notes taken when alive:—5 rich salmon-coloured lines on the sides, running parallel with the lateral line commencing at the pectoral; a dark red line immediately at the base of the pectoral fin; 5 small black spots irregularly disposed on the lateral line over the pectoral fins; first three rays of the dorsal fin with a black spot; second and third spine of the rays bright blue. The figure given, vol. i. Mag. of Zool. and Bot., is not correct. The spot on the tail is more of an oval shape than is represented in the figure; the row of pores over the eye is very conspicuous. You mention a range of spots occurring in the specimens you examined; they likewise occurred in mine between the upper salmon-coloured line and the lateral line. I consider the figure too deep for the fish; the specimen I have taken is more slender than *C. Tinca*. * * * * * * The seeing a specimen of *C. microstoma* taken, and the capture of *C. rupestris*, has caused me to spend a great deal of my time fishing for them. The bait I use is a cockle."

THE CORKLING, *Crenilabrus pusillus*,
——— *multidentatus*,
(See Yarrell's British Fishes, vol. i. p. 330,)

Has been obtained on the coast of Cork.

[The latest note relative to this species which we have found amongst

* Mr. Yarrell has since informed me that this vignette was drawn from a specimen of *C. rupestris*.

Mr. Thompson's papers is the following, which he published in Annals of Nat. Hist., vol. ii. p. 418.—ED.]

"*On the identity of* Crenilabrus multidentatus, *Thomp., and* Labrus pusillus, *Jenyns.*

"In the month of June, 1837, I with some doubt characterized a *Crenilabrus* as new, under the specific name of *multidentatus* (Proc. Zool. Soc., 1837, p. 56), and subsequently gave a more detailed account of it, Mag. Zool. and Bot., vol. ii. p. 449. From the species possessing some of the principal characters of *Lab. pusillus*, I lately felt desirous of comparing specimens of this fish with mine; and for this purpose Mr. Yarrell very obligingly forwarded to Belfast, for my examination, the only specimen of it he possessed, and which is one of the original individuals described by Mr. Jenyns. A comparison of this specimen, $2\frac{1}{4}$ inches in length, with my own proved the species to be the same.

"It must be stated that *C. multidentatus* was considered not to be a distinct species, even without critical attention having been given to the description of *L. pusillus*. The following are the chief differences that led to the belief of their non-identity:—

C. multidentatus.	*L. pusillus.*
"*Teeth* numerous and large, *two* rows in the upper, one in the lower, jaw, number in lower 26, outer row of upper jaw 20.*	"*Teeth* of moderate size, conical, regular, about 16 or 18 in each jaw.
Upper *jaw* the longer.†	*Jaws* equal.
Colour (in spirits) very pale greenish brown on the back, olive-green on the sides, becoming paler beneath, sides with darker *longitudinal* bands throughout; 3 blackish spots, one on the pre-opercle behind and rather below the centre of the eye, a second on the body at the base of the caudal fin and at its lowermost portion, and the third at the base of the last ray of the dorsal fin."	*Colour*, (in spirits) yellowish brown, with irregular *transverse* fuscous bands; dorsal irregularly spotted with fuscous; anal light brown; the other fins pale."

Mr. Yarrell's specimen, which is in excellent preservation, has no appearance whatever of transverse fuscous bands, like the individual described by Mr. Jenyns; it is also free from spots, thus differing again from mine.‡

When looking over Dr. Ball's collection of native fishes in June last, I had the pleasure of seeing among them a *Crenilabrus*, which accorded better, in some respects, with Mr. Jenyns' description of *L. pusillus* than the smaller specimens, and, compared with them, differed in several points of view to be hereafter noticed.

This individual—4 inches 11 lines in length—is larger than any of this species recorded in the Manual of British Vertebrate Animals. Excepting that the ascending margin of the pre-opercle is not "very oblique," it

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* My specimens, with the teeth more numerous, were nearly one-half smaller than the one which (from the length of 4 inches being assigned to the species), I presumed, served for Mr. Jenyns' description.

† The difference in the length of jaws is very trivial.

‡ See an excellent figure in the Mag. Zool. and Bot., vol. ii. pl. 13, to which draughtsman and engraver did equal justice.

agrees with the specific characters there attributed to that species, and generally with the detailed description of dimensions. So far as the brief description of colours in the Manual enables a judgment to be formed, there is a similarity between them. The specimen before me (preserved in spirits) presents considerable variety of colours. Two-thirds of the upper portion of the sides and entire body, from origin of anal to base of caudal fin, of a pale but rich brownish red, with faint indications of several transverse dusky bands; remainder of anterior portion to ventral profile yellowish grey. Head variously coloured in stripes, &c., somewhat in the manner of *Labrus variegatus*, Gmel., and others of the *Labridæ;* iris bright red, lips orange; dorsal fin pale, varied with red and dusky tints; of this latter colour from the first to between the third and fourth rays; a black spot, partly on the body and partly on the base of the two last rays, terminating this fin; pectorals reddish, with a black band at the outer base of the rays (similar to that in the variety of *Crenilabrus Tinca* called *C. Cornubiensis*); ventrals pale, with reddish markings; anal fin with faint dusky markings alternating; caudal fin pale dusky, irregularly tinged with a reddish colour.

D. 19 + 11 (last double); A. 3 + 9; P. 14; V. 1 + 5; C. 13 or 14 conspicuous (21 altogether) = Br. 5.

This individual has the ascending line of the pre-opercle less oblique than the smaller specimens; the teeth, instead of the uniformity of arrangement described in *C. multidentatus*, increasing somewhat gradually in size towards the centre, 21 in the lower, and a similar number in the outer row of upper jaw; a dark brown marking appears down the centre of many of them; those of the other individuals are uniformly transparent. Scales three or four fewer in number on the lateral line in the large specimen than in the others, and the tubular projections on those throughout it less developed; in it likewise the concentric *striæ* of the scales are less strongly marked, and the lineated appearance (produced by the *striæ* of each scale being more deeply cut along the centre than elsewhere) less apparent than in the others. The colour already described is very different from that of the smaller specimens. This individual, as well as those described as *C. multidentatus*, was obtained at Youghal.

THE SMALL-MOUTHED WRASSE, *Crenilabrus microstoma*, Couch,
——— *exoletus*, Linn. (sp.),
(See Yarrell's British Fishes, vol. i. p. 341,)

Has been taken on the North-East and West coast.

In the month of June, 1836, a species of *Crenilabrus* was found on the beach of the County Antrim near Carnlough, by my friend Dr. J. L. Drummond, when engaged in collecting *Algæ*, and, on his return to Belfast shortly afterwards, was kindly handed over to me. Being apparently undescribed, I at once drew up a minute account of it. When in London at the beginning of last summer, I ascertained that the same species had been met with in Cornwall by Mr. Couch, who likewise considered it as new, and sent two specimens to Mr. Yarrell, under the appropriate name of *C. microstoma*, a term which, although unpublished, I consider it but fair to adopt, as Mr. Couch had the priority in obtaining the species.

Its most prominent characters are:—Body rather deep, mouth small, teeth few in number, and rounded or truncated at the summits: scales very large, those on the body concealing the base of the dorsal and anal

fins, but none on these fins; anal fin with five or six spinous rays, ventral scale half the length of ventral fin, no blackish spots on body or fins.

D. 19 + 6; A. 6 + 7; P. 13; V. 1 + 5; C. 14, and some short = Br. 5.

Detailed description.—Length 3 inches; depth to entire length nearly as 1 to 3½; first quarter of dorsal profile sloping moderately upwards, second flat, third turning rather suddenly downwards, and terminating with the dorsal fin; thence straight to the base of the caudal fin;* ventral profile very convex, sloping equally from both extremities to centre; head occupying about one-fourth of entire length; jaws equal; mouth small; lips double, much resembling those of *Labrus maculatus*, Bl.; teeth strong, rounded or truncated at the summits, not serrated, a single row of twelve, rather uniform in size in the lower jaw; two rows at the interior part of upper jaw, those of the outer row the larger, and seven in number, exceeding the teeth of the lower jaw in size; eyes large, more than their diameter distant from the snout, their distance from each other equal to their diameter; a row of pores round the eyes, and some on the top of the head; pre-opercle somewhat rounded at the base, ascending rather obliquely, strongly serrated, the denticulations extending half-way along its base, covered with small scales: opercle somewhat triangular, covered with large scales; scales on the body very large, smooth, and roundish at their free margins; three rows above lateral line, nine below it; lateral line for two-thirds anteriorly placed high, at one-fourth of the depth, and the precise form of dorsal profile; ventral central; dorsal fin commencing at one-fourth of the entire length from snout, and continuing to near the tail, ending almost in a line with the anal fin; first ray very short, but they gradually increase to the twenty-fourth, which is longest; a membranous filament near the point of each spinous ray; pectoral fin two-thirds the length of head, originating in the same line with the dorsal fin; ventral fin beginning at about one-third of the entire length from the head; ventral scale about half the length of ventral fin; anal fin originating nearly in a line with the fifteenth spinous ray of dorsal fin, and, like it, when laid against the body, reaching to the outer short rays of the caudal fin, the dorsal rather exceeding the anal in length; caudal fin obscurely rounded, and covered with scales at the base for one-fourth of its length; scales of the body concealing the base of the dorsal and anal fins, but none on the fins.

Having had an opportunity in the present month (October, 1837) of looking over the collection of fishes obtained on the coasts of the Counties of Londonderry and Antrim, during the progress of the Ordnance Survey, I had the satisfaction of seeing three specimens of the *C. microstoma*, which were liberally offered for my use by Captain Portlock, R. E., who at the same time suggested that, if desirable, a drawing of one of them should be made by the gentleman attached as draughtsman to the Survey. To this kindness I am indebted for the drawing which accompanies the paper, the original specimen having been too much dried up by exposure on the beach to be available for this purpose. Of these individuals, the first was obtained at the mouth of Lough Foyle (County Londonderry), and the others in the small bay at Carnlough, where the

* Two specimens have this form; the other two have the dorsal profile finely arched, and from the centre slope equally to each extremity; in these the ventral profile is rather less convex than in the former. The difference is probably sexual.

specimen was found by Dr. Drummond. These are respectively 4¾, 5, and 5¾ inches in length, and those sent from Cornwall to Mr. Yarrell being about the same size, render it probable that they may be full grown. Their colour in spirits varies slightly, but the one which best retains its original markings may be described as having the sides of a deep salmon colour, with a dusky tinge; upper part of head purple; upper margin of eye and orbit blackish; stripes of violet and orange alternating below the eye longitudinally to near the mouth, where they become vertical; belly silvery white; some of the scales, including those on which the lateral line appears, tinged with a golden metallic lustre; dorsal fin violet-blue at the base, with an orange stripe above; anal fin violet-blue, striped with reddish orange; pectoral fin brownish orange, with a dark stripe at its outer base, as in *C. Tinca*; ventral fin diaphanous, tinged with orange; caudal fin dusky, towards the tip blackish. The fin-rays of these three specimens are:—

D. 19 + 7; P. 14: V. 1 + 5; A. 5 + 7; C. 13? and some short= Br. 5.

D. 19 + 6; P. 13; V. 1 + 5; A. 5 + 7; C. 13, and some short.

D. 20 + 6; P. 13; V. 1 + 5; A. 6 + 7; C. 15, and some short.

In the number of spinous rays in the anal fin this species agrees with a British *Crenilabrus*, the "Scale-rayed Wrasse" of Couch (Mag. Nat. Hist., vol. v. pp. 18 and 742), which, however, differs from it widely in the form and number of the teeth, in the number of dorsal fin-rays (21 + 8), in having processes of imbricated scales between the rays of the dorsal and anal fins, and, above all, in form, being "very much elongated." With the *L. exoletus*, which has a wide range over the European seas, it accords more nearly than with any other species I have seen described. The number of spinous rays in the anal fin is the same, but the *L. exoletus*, as described in detail by Risso (Hist. Nat. l'Eur. Merid. t. iii. p. 329, ed. 1826), differs from it in the number of rays in the dorsal fin (20 + 9), and in having scales on its base, in the teeth (which are pointed), and in having a large black spot on the caudal fin. Linnæus, in his description of this fish (*Labrus exoletus*, Syst. Nat. t. i. p. 479, ed. 13), gives about the same number of rays in the fins as the Irish specimens possess; but the brevity of his description* precludes farther comparison, and at the same time it leaves us in doubt whether his *Labrus exoletus* and the *Crenilabrus microstoma* may not be identical.

[The foregoing observations were published by Mr. Thompson in the Magazine of Zool. and Bot., vol. ii. He had previously contributed to the Zool. Proc., 1837, a short notice of the specimen found by Dr. Drummond.—Ed.]

Mr. M'Calla wrote to me as follows, from Roundstone, 25th September, 1840:—

"I have this day seen a specimen of *Crenilabrus microstoma*, about six inches long, taken here. I could not get it from the person, but as I have some boys engaged fishing for me I trust to secure specimens of it. I am positive as to the species, for I have your paper on this family and it is figured."

* "Pinna dorsali ramentacea corpore lineis cæruleis, pinna ani spinis 5. D. 19.25; P. 13; V. 1.6; A. 5.13; C. 13."

ORDER II.—MALACOPTERYGII.

DIV. I.—ABDOMINALES.

Family CYPRINIDÆ.

THE COMMON CARP, *Cyprinus Carpio*, Linn.

THIS fish, which was introduced into the British Islands, has long been in Ireland. Localities noted:—Montalto and Killyleagh, County Down; and Markethill, County Armagh (Mr. J. Sinclaire); County Dublin (Dr. Ball); Counties of Galway and Sligo (Mr. R. Barklie).*

These are localities of which I happen to have heard; there are probably many others, but this is of little consequence with regard to an introduced species. Dr. Ball informs me that some years ago he was present at the capture of two or three dozen of carp in a pond covering several acres of ground at Abbeyville, near Malahide. The largest weighed 17½ lbs. and the smallest 6 lbs. Tench, minnows, and rudd were also in this pond.

The Chub (*Cyprinus Cephalus*) and the Barbel (*Cyprinus Barbus*) are included in Dr. P. Browne's catalogue (1744); but we require something more than the mere writing out of a name before we can include species in our Fauna. This catalogue is carelessly drawn up.

THE GOLDEN CARP, OR GOLD AND SILVER FISH, *Cyprinus auratus*, Linn.

In some ponds near Belfast this species bred the first year of its introduction; in others, not for several years; and in one the fishes have never increased. The temperature of the water in the first was warmest, and in the last coldest. A gentleman who resides in this neighbourhood informed me of a singular fatality which befell a gold-fish confined, at his house, within a glass globe such as is usually appropriated to their use. The globe filled with water and containing this fish was placed at the drawing-room window: the rays of the sun thus collected, formed a focus on a table covered with a woollen cloth, and the consequence was, that both the cloth and table were partially burnt. The fish, as may be anticipated, was dead when the accident was discovered.

31st May, 1846.—In the pond before Hampton Court Palace [England] are very large and variously coloured fish of this species, and I was interested to-day in looking at them feeding. They often made a stoop vertically downwards to seize small objects, living, I presume, on the *chara* and other plants covering the bottom of the pond; and I particularly remarked that one of the fishes several times cropped the *chara* itself.

THE GUDGEON, *Gobio fluviatilis*, Will.,

Inhabits many of the waters of Ireland, preferring gravelly and oozy bottoms.

Localities noted:—Lough Neagh and River Lagan, County Antrim; Liffey and Royal Canal, Dublin (Dr. Ball); Kilkenny (Tighe); The Barrow (Rev. B. J. Clarke); The Shannon Canal near Portumna and brooks

* Introduced by the great Earl of Cork into the South of Ireland.—*Vide* Robert Boyle in a paper to the Royal Society.—*R. Ball.*

about Killaloe (The Rev. C. Mayne and Mr. Marshall); streams about Tuam and Headfort (Mr. M'Calla).

"These fish first appeared in the river Lagan in 1801, having ascended the canal from L. Neagh, where they have been inhabitants perhaps for centuries." —*Templeton's Catalogue.*

Mr. John Russell, jun., of Newforge, tells me that a bitch kept chained near the "tail race" at Newforge bleach-green near the river Lagan, was in the habit when the water was low (about 9 ins. deep), the moment she was let loose, to go in search of gudgeons, which she caught and ate in quantities: he has often seen her do so—he thinks she may not have been very well fed.

Three small fishes of equal size, being 1 inch 2 lines in length, taken by Mr. Hyndman and myself, on the 8th and 9th May, 1826, in the Lagan, appear to be of this species, as described in detail by Jenyns, but with the highest power of my lens I cannot distinguish any tentacula about the mouth of any of the three.

These specimens were found resting on the bottom of shallows in the Lagan at Newforge; their colour so assimilated to the bottom that even in bright sunshine, and the water clear and less than a foot deep, they could hardly be seen except when in motion.

I have met with small specimens, each having a series of blackish spots along the middle of the sides, just as represented in the fig. in Cuv. and Val., vol. xvi. pl. 481.

The figures in the works of Donovan, Yarrell, &c., do not exhibit any spots, nor, indeed, do full-grown specimens of the fish in my collection.

The Tench, *Tinca vulgaris*, Cuv.,

Is probably, like the carp, a fish introduced to the British Islands. I have notes of its existence at the following localities:—Ponds at Purdysburn and Montalto, County Down (Mr. J. Sinclaire); Counties of Dublin and Cork (Dr. Ball); Lakes of Westmeath (Newenham); Lough Derg, near Portumna (Mr. John J. Marshall).

"*Tench, Cyp. Tinca.* Many were caught in the river Lagan, after the breaking of the bank of a pond in the demesne of Lord Dungannon at Belvoir."—*Templeton MS.* [No date.]

The Bream, *Abramis Brama*, Cuv.,

Inhabits many of the Irish lakes and slow rivers.

Dubourdien mentions this species, and Templeton remarks that in L. Erne breams are particularly abundant. I have been informed by Lord Enniskillen that they attain a great size in the lakes of that quarter.

March 12, 1835.—James Ward, of Lagan Cottage, mentioned to me that the way in which the bream is taken with the greatest success is by balls of grains from distilleries, seeds (cast off from flummery) or boiled oats being mixed up with potatoes in the form of balls, and thrown into the river at night. Bream, being partial to such food, collect from all quarters to partake of it, which the fishers take advantage of by the break of day on the following morning, and, baiting their hooks with worms, catch in great numbers the fish thus collected together. This method was, he says, introduced in his neighbourhood by persons who had been in the habit of thus fishing in the County Fermanagh, about L. Erne.

Ward says there were no breams in the Lagan twenty years ago, which I have before heard stated on good authority.

The same informant told me in August, 1843, that the quantity of breams

taken by Mr. Emerson in the canal two or three years ago filled six horse buckets, and that a number of them had attained 7 lbs. weight.

Ward kept them in a small pond to recover for two or three months after their capture, and he states that it was only some of the small ones that died: all the large survived.

In the summer of 1836 also, when the water was low in the Lagan canal, great numbers were netted and carried away in sacks.

August 23, 1837.—I examined several specimens of bream which I got off the strings of fishers in the Lagan yesterday. [The following are Mr. Thompson's notes respecting these fishes.—ED.]

No. 1.—6¾ inches long; 54 or 55 scales on lateral line. D. 11; A. 2+27; C. 19; P. 17; V 1|9. Depth to length, 1 to 3⅓.

No. 2.—6¼ inches long; 53 to 55 scales on lateral line. D. 11; A. 2+27; C. 19; P. 18; V. 1+10. Depth to length, 1 to 3⅓.

No. 3.—6¼ inches long; 58 scales on lateral line. D. 11; A. 2+26; C. 19; P. 17; V. 1|9. Depth to length 1 to 3¼.

In the muddy Lagan this species is commonly of a "silvery bluish white," which the *A. Blicca* is described to be, in contra-distinction to *A. Brama.*

March 15, 1836.—On inspection of the proceeds of a fishing-rod at 2nd locks of Lagan canal, I found two breams. The larger about 12 inches long; its yellow colour, and possession of 30 rays in anal fin, proved to me that it was the *Cyprinus Brama.* The other specimen was 8 inches long, and of a silvery blueish cast of colour; it had, besides, but 26 rays in anal fin. This induced me to obtain the specimen and see if it were really the *C. Blicca.*

The following are particulars of it:—D. 11; A. 26; C. 19; P. 17; V. 9. Depth at commencement of dorsal between 3 and 3½ times in whole length (see Jenyns, p. 407).

Number of scales in lateral line, and number in depth, cannot be reckoned accurately, as the fish has been injured. Those in lateral line, I would presume, were 52; it is slightly depressed at nape, as *C. Brama.*

Colour.—Rays of P. fin tinged with scarlet, which colour appears likewise on the few first rays in all the other fins; irides silvery, delicately tinged with pink, but a yellow line around the pupil of the eye.

It thus appears that this specimen is intermediate between the *C. Brama* and *C. Blicca*, as described by Jenyns and Yarrell, both in "form" and "colour." I have, however, preserved it for future examination.

THE LARGE-SCALED BREAM, *Pomeranian Bream*, Yarr.,
Abramis Buggenhagii, Thomp.,
Cyprinus, — Bloch,

Has been taken in the sluggish river Lagan, in which the common bream (*A. Brama*) is abundant.

To the following communication, which I made to the Zoological Society in 1837, nothing more can at present be added:—

* *Abramis Buggenhagii*, Large-scaled Bream. *Cyprinus Buggenhagii*,

* On my showing this specimen to Mr. Yarrell, he immediately produced from his own collection another example of the species of much larger size, measuring 14 inches in length, which had been presented to him by a friend, who caught it in the waters of Dagenham Breach, in Essex, from which place others have since been taken. My specimen was taken about the same time in the Lagan. This bream is at once distinguished from both the other species of British bream, by the much greater thickness of its body.

Bloch. Part 3, tab. 95. On inspecting the produce of a fishing rod at the river Lagan, near Belfast, on the 6th of May, 1836, I detected a bream differing from the common species, and secured it for examination. It agreed so fully with Bloch's description of the *Cyprinus Buggenhagii* as to satisfy me of its identity, the only difference consisting in the number of rays in the pectoral fin, 12 being enumerated by him, and 18 appearing in the specimen; several of them, however, being very short, may have escaped Bloch's notice.

The description drawn up from my specimen the day it was procured is as follows:—Length, 5¼ inches; depth, 1¼ inch; head one-fourth of the entire length; diameter of the eye equal to one-fourth of the length of the head; scales on the lateral line about 45, about 9 rows between it and the dorsal ridge and 5 rows below it; under point of the caudal fin longer than the upper. Colour of the sides silvery, tinged with blue towards the back; irides very pale yellow; the dorsal, pectoral, ventral, and anal fins nearly transparent, or very slightly tinged with dusky, chiefly towards their extremities; caudal fin pale yellow.

D. 11; P. 18; V. 1 + 9; A. 20 (first extremely short); C. 18.

This species, which is new to Britain, is stated by Bloch to be found in Swedish Pomerania, in the river Pene, and in the lakes communicating with it.*

More attention to our fishes will probably show that this species is not confined to the one river.

THE RUDD OR RED-EYE,† *Leuciscus erythropthalmus*, Cuv.,

Is found from North to South of the island,—chiefly in lakes and slow rivers. It is probably found in every County possessing suitable localities.

Rutty noticed the "Roche" as frequent in the Liffey and Finglass Brook; and Templeton made the following note in reference to the rudd:—"Exceedingly common in the North of Ireland, where it is mistaken for the roach."

Three specimens of the "Red Roach" of L. Neagh which I examined in March, 1835, were as follows:—

1st specimen.—Length 6¼ inches, breadth 1 inch 10 lines. B. 4; D. 1|11, (reckoning 2 last from same base); P. 17; one V. 8, other 9 rays, yet both apparently perfect; A. 1|12, reckoning 2 last from same base; C. 19.

2nd specimen.—Length 6¾ inches; breadth 2 inches; B. 4; D. 1|10; P. 16; V. 9; A. 1|12; C. 19.

3rd specimen.—Length 6¼ inches; breadth 1 inch 10 lines; B. 4; D. 1|10; P. 16; V. 9; A. 1|13; C. 19. *Irides* silvery tinged with pale orange, pupil black. *Lateral line* as in Donovan's pl. 40. *Colour*, "back dusky green, sides and belly silvery." P. and D. fins dusky, the latter faintly clouded with dull red towards the extremity; the greater portion (towards extremity) of V., A., and C. fins bright scarlet.

THE MINNOW, *Leuciscus Phoxinus*, Cuv.,

Is found in several localities within the Counties of Dublin and Wicklow, to which it is believed by some persons to have been introduced.

Extract from the MS. of John Templeton, Esq. (no date):—

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* Zool. Proc. 1837.

† Most frequently called "Roach," or "Red-Roach," throughout Ireland.

"*Minnow, Cyprinus Phoxinus.*—In Ireland I have not heard of their being found in any river but a small stream near Swords in the County of Dublin, where, as I have been informed by Mr. Martin Kelly of Dublin, they may be found in considerable numbers."

James Callwell, Esq., of Dublin, told me in 1835, that about 10 years previously, Lieut. Stone introduced the minnow to Drumcondra river near Dublin, and that the species had become abundant there.

At a meeting of the Dublin Natural History Society held in June, 1844, —Dr. Scouler in the chair—specimens of the minnow, taken at Balgriffin, about 6 miles from Dublin, were exhibited.

"The chairman observed that this was a very local fish in Ireland, and in many districts rare, while in Scotland it occurred in vast abundance in every subalpine stream. He stated it was worthy of inquiry what influence the geological structure of a country could have in the distribution of fresh-water fishes. In the present instance the minnow was scarce in Ireland, where calcareous rocks predominated, while it was frequent in Scotland, where the waters were often remarkably free from calcareous matter."—*Saunders' News-letter*, June 22, 1844.

John E. Herrick, Esq. wrote to me as follows, in March, 1849:—"There are no minnows in our southern rivers. I took some to Cork and placed them in two streams, with what effect I cannot as yet say. I have heard that they were introduced from England into the Tolka. They are however in the Dodder and in some ditches near Harold's Cross."

Dr. Ball favoured me with the following note dated July, 1846:—"When in Wicklow I saw numbers of minnows in Lough Dan. The fisherman said he had been there 25 years, and that they were as plentiful when he came as they are now."

When visiting Dovedale (Derbyshire) on 29th June, 1835, I procured a few minnows out of a large shoal in the river Dove,—the first of the species which I had seen alive. Each of them had a broad black line on its sides, which led me at first to believe that they were of some other species.

Yarr. and Jenyns do not describe this black lateral marking, nor is there any indication of it in the figure given by the former author or by Donovan.

The largest minnow of which I have a note was taken by Dr. Ball in a pond at Glasnevin Garden (Dublin); it was 6 inches in length.

There is an interesting account of the minnow in the Gardener's Chronicle of 19th July, 1845, p. 489.

The Loach, or Bearded Loach,* *Cobitis barbatula*, Linn.,

Is pretty generally diffused over the island and localities noted:—County Londonderry (Ordnance Collection); Counties of Monaghan and Cavan (J. T. Tennent, Esq.); streams about Florence Court (Lord Enniskillen); County of Dublin and river at Ballitore, County Kildare (Dr. Ball); streams near Barrow (Rev. B. J. Clarke); Killaloe (Rev. C. Mayne); Portumna (Mr. J. J. Marshall); small rapid streams in South-West of Cork (Professor J. Allman). [We recently procured specimens from County Wicklow.—Ed.]

Rutty says in reference to the Loach, "It delights in clear rivers, and is fre-

* Also called "Redbeard," "Beard-dod," "Killoch," "Culloch-rue," and "Coleen-ruadh" (Red-girl).

quent with us, and good food. It is customary with many to take it alive, in a glass of generous wine."—Vol. i. p. 366.

J. T. Tennent, Esq. supplied me with the following note on this species:—"With reference to Donovan's remark about the necessity of keeping the water in which they are removed from one place to another in constant agitation, it may be stated that those I have seen were kept in a common bowl of water quietly resting on a table, and never, I believe, intentionally moved except when getting fresh water."

THE GRAINING; *Leuciscus Lancastriensis*, Yarr.
THE SPINED LOACH; *Gobitis Tænia*, Linn.

Several very small individuals of the former species occurred to me in the river Leam near Leamington, in July, 1836; and in the same month, when using my net for fresh-water mollusca in a drain near Guy's Cliff, Warwick [England], I captured a minute fish of the latter species, as mentioned in the Zool. Proc. for 1837, and by Mr. Yarrell in his Hist. Brit. Fish.

Neither of these species has as yet been observed in Ireland.

Family ESOCIDÆ.

THE PIKE, *Esox Lucius*, Linn.,

Is common.

Localities noted:—County of Londonderry; said to have been taken in "salt-water" between Derry and Culmore (Ordnance Surv.); all suitable lakes in the northern part of the island (Lough Neagh, Lough Derg, &c.); County Dublin (Dr. Ball); the Shannon (Mr. R. Barklie and the Rev. C. Mayne); Loughs Corrib, Mask, and Carra (Mr. M'Calla).

The pike is most frequently taken by night-lines baited with fish, and is said to be "always good, except in February and March, when they are spawning." Great numbers are, however, taken by means of draught-nets in Lough Neagh, the average weight being from 1½ to 4 lbs. The Rev. C. Mayne, writing from Killaloe in 1838, gave me the names of two gentlemen who killed pikes of 49 and 51 lbs. weight in that locality; and also informed me that "in August, 1830, Mr. O'Flanagan (then aged 70) killed with a single rod and bait, in a lake in the County Clare, a pike of 78 lbs." In April, 1835, Dr. Ball received from the then Dean of St. Patrick's one of these fishes 4½ feet long and weighing 37 lbs.; the largest which I have seen in the Belfast market was sent from Lurgan in January, 1851, and believed to have been taken in Lough Neagh; it weighed 36 lbs.

I have been informed that larger examples are obtained in small lakes, such as those in the neighbourhood of Downpatrick and Ballynahinch in the County of Down, than in those of greater extent.

March 22, 1838.—On opening a pike about a foot long, I found a trout (*S. Furio*) of about 5 inches in its stomach. The gastric juice had acted considerably on the half which was lowest down, but the upper half was as bright and perfect as when the trout was alive. The victim was just in the same state as I have seen fishes in the stomach of a Goosander.

R. Langtry, Esq., informs me that in summer he has often seen pike in "the grass," *i. e.* in plashy places with the fins of their backs above water.

THE GARFISH, GAR-PIKE, OR MACKEREL GUIDE,* *Belone vulgaris*, Cuv., Is taken around the coast.

The seasons in which this species is generally taken are the latter part of summer, and autumn; but I have seen a few specimens which were procured early in the year. On 23rd April, 1845, one of these fishes caught near the quays of Belfast was brought to me, and I had it preserved for the Belfast Museum. It approached some labourers who were working at a new dock, and was killed by a blow from a spade or some such implement. No other fishes were observed with it. This specimen was remarkably fat: 29¼ inches long; weight, 1 lb. 10 oz.; depth, 2½ inches; girth in the middle, 6¾ inches.

Mr. James Marshall informs me that these fishes are all taken singly in Belfast Bay, and generally not more than one during several hours mackerel fishing; but each boat about the Greypoint generally brings home one of them. The bone in vertebral column of this species is green before as well as after being boiled. I found a fifteen-spined stickleback in the stomach of one taken in the Bay last-named, on 10th Aug., 1850, by a friend who was streaming for mackerel, and the bait used was a spotted gunnel.

The following is an extract from Dr. Ball's lecture:

"The *Belone vulgaris* has a strange habit of jumping over floating substances; of this, advantage is taken on the coast of Donegal, where numbers of this fish are caught in nets strained on frames of wood, and suffered to float on the surface of the water, when the fish jumping over the sides are captured."

Dr. Ball has also favoured me with the following note on the same subject:—

"*Belone vulgaris*, common at Youghal. Its mode of jumping from the water is peculiar and phantom-like; it shoots bolt upright and falls back again tail foremost; when hooked, it makes more efforts to escape than any other fish I know. I have seen it, after breaking loose, perform most curious tumblings on the surface for some minutes."

In Sept., 1848, Mr. Samuel Lyle sent a large specimen to the Belfast Museum, and informed me that he has often seen these fishes about Portrush, where they are called *Spearling*, and are especially sought for with nets of a particular kind—that they may be had for bait, for which purpose they are excellent. He once caught one there with a piece of the grey gurnard as bait.

Mr. Bernard Meenan† says that, in Strangford Lough, this species is

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* Called "Horn-eel" in Belfast Bay, and "Mackerel-scout" in Strangford Lough, "Spearling" at Portrush, "Spanish Mackerel" at Roundstone (Mr. Nimmo).

† Mr. Bernard Meenan, whose name is of frequent occurrence in the following pages, as affording information to Mr. Thompson relative to the different kinds of fish brought to the Belfast market, was a well-known fishmonger of much practical experience. He died in January, 1854, and consequently in less than two years after the decease of Mr. Thompson. The death of Mr. Garrett took place in April, 1855.

If a lesson were needed on the uncertainty of human life, or on the importance of placing on record the facts observed or communicated in any department of Natural History, it might be based on the brief obituary now given. In

chiefly taken at Killinchy, 2 dozen being sometimes captured in the herring nets in the course of a night's fishing. He has seen shoals of them often about Carrickfergus in summer on the surface of the water.

There is a prejudice against this fish, in consequence of its bones being green, but I have known of its being brought to table and highly approved of.

February, 1835.—Two stuffed specimens examined by me were as follows:—

No. 1.—26½ inches long.

D. 1|17; P. 13; V. 6 (?) A. 1|21; C. 15 (not reckoning any of the lateral rays); B. 12.

2nd specimen also 26½ inches in length; D. 1|19; P. 13; V. 6; A. 1|22; C. 15; B. 14.

A specimen in the Belfast Museum is 2 feet 9 inches in length.

Donovan's figure (plate 64) of this fish, under the name of *Esox Belone*, is excellent.

THE SAURY-PIKE, SAURY, OR SKIPPER, *Scomberesox Saurus*, Flem.,

Has been taken (but very rarely) on the North and East coasts.

Sampson includes it in his Fishes of Derry; from his remarks, however, it seems doubtful whether the *Esox Belone* is not the species referred to, although both are mentioned. Templeton in his Catalogue says:—

"This curious and rare fish appears to visit the coast of Ireland very seldom, for, notwithstanding all my inquiries about the natives of our coast, I was never able to procure a specimen, until one was caught near the Long Bridge, Belfast, and brought to me in 1820."

On 17th Sept., 1840, I received from Mr. Wm. Darragh a fresh specimen of this fish, 12¼ inches in length, and which was found in a pool left by the receding tide on the long strand near Belfast, after a strong gale: there was but the one.

Another was taken near Belfast on the same day. An oar touching the water caused it to dash on the sandy beach, where, as "it could not turn round to the water again, like an eel," it was captured.

On the 7th of the following month a third example was seen in the Bay.

The only other native specimens which I have seen were the three following, all of which were stranded: viz., one measuring 11¼ inches, found by Mr. J. R. Garrett, at Clifden (Belfast Bay), on 13th Sept., 1844. Another, measuring 13¾ inches, obtained by Mr. G. C. Hyndman, near the Lagan Bridge (Belfast), in the first week of Oct., 1847; and the third, measuring 12 inches, found by myself on the beach south of Newcastle (County Down), on the 23rd July, 1851.

Dr. Ball saw a specimen in possession of the late Dr. Coulter, but has no other information as to the occurrence of this species in Ireland.

"*Scomberesox Camperi*, Lacep." is the name adopted for this fish by Cuv. and Val., in vol. xviii. p. 464, where it is stated to have been confounded with the Mediterranean sp., which is different, and on which "*Scomberesox Rondeletii*" is bestowed by Valen.

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a space of little more than three years, he who imparted the information, he by whom it was noted down, and he by whom those notes were arranged for publication, were all carried off by death.—*R. Patterson.*

THE FLYING-FISH, *Exocœtus* ——(?),

Is said to have been seen off the Southern coast.

In the second vol. of the Annals Nat. Hist. I published the following note:—

"EXOCŒTUS ——(?), Flying-fish.—I am informed by Dr. Ball, that, according to the testimony of several intelligent fishermen at Youghal, flying-fishes have in different years been seen by them in summer, near the southern coast of Ireland—[off the coasts of Waterford and Cork]—the accurate manner in which they describe the 'flight,' &c., leaves no doubt on my mind that the fishes alluded to must have been some species of *Exocœtus*."

Specimens have not been obtained to enable the sp. to be determined.

THE SLY SILURUS, *Silurus Glanis*, Linn. (?)

The following notice of a fish resembling this species contains all the information which I have been able to procure on the subject.—It was contributed by me to the Annals Nat. Hist. vol. vii.

"*Silurus Glanis*, Linn. (?), Sly Silurus. That this species has in a single instance been taken in Ireland I am disposed to believe, on the following testimony:—On inquiry (October, 1840) of William Blair, who has for many years been fisherman, &c., at Florence Court, whether he had ever met with any rare fish, he described an extraordinary one, of which he could never learn the name, that he took twelve or thirteen years ago in a tributary of the Shannon, near its source, and about three miles above Lough Allen. His description was so graphic and particular, that Lord Enniskillen, on hearing it, immediately suggested its applicability to the *Silurus*; and, on Yarrell's figure being shown to the intelligent captor of the specimen, he at once identified it as in all respects representing his fish, except in the head and mouth not being large enough. Professor Agassiz, who was present, on being appealed to, stated that these parts were certainly not represented of sufficient size in the figure. The fish was seen struggling in a pool in the river after a flood, and "with the long worm-like feelers from its mouth;" and its general appearance was looked upon as so hideous that the persons who first saw it were afraid to touch it. The specimen was at least $2\frac{1}{2}$ feet in length, and 8 or 9 lbs. in weight. Although unfortunately 'lost to science,' it, for two or three years, or until the skeleton fell to pieces, adorned a bush near the scene of its death. The species was not known as an inhabitant of any of the neighbouring waters by the persons of the district.

"The distribution of the *Silurus Glanis* on the continent of Europe is somewhat anomalous, as I learn from M. Agassiz.* In Central Europe it is found in the lakes of Neuchatel, Bienne, and Morat only:—in no other lakes or rivers connected with the Rhine does it occur. It inhabits the rivers flowing into the Baltic and Black Sea."

Family SALMONIDÆ.

THE SALMON, (called Parr or Graveling when young,) *Salmo Salar*, Linn., *Salmo salmulus*, Turt. (Young Salmon),

Is common: it is unnecessary to specify localities, as the chief Irish fisheries are well known.

John Sinclaire, Esq., who has had much experience in salmon-fishing, holds the opinion that salmon are in season all the year, and spawn during every month. When the rivers are too low for them to ascend, he considers that they spawn about their mouths in the sea. To illustrate his views Mr. Sinclaire took me to Belfast market on 3rd April, 1840, where

* See also Cuv. and Val., vol. xiv. p. 337, on this subject.

we examined seven of these fishes from Glenarm, four of which were large, perhaps 2 feet 9 inches long, and in as fine condition as fish could be: the other three were smaller, about 2 feet in length, and were the most miserably spent fish I ever saw. All their scales were loose; on the larger ones the scales were firm. Of the small fishes one was a male and two were females; these latter had each the lower jaw slightly hooked, which induced a friend who was present to think that they were male fish; they were, however, unquestionably females, proved by the operculum, and by the mouth, which was in them only about half the size it was in the male of equal length. The three were unquestionably salmon, proved by the forked tail, the black pectorals, the round spot on operculum, and the few salmon spots on sides.

On *4th May*, 1842, Mr. Sinclaire took ova rather larger than hemp seeds, and in a firm state, from a salmon in Belfast market; the fish weighed about 14 lbs.

On examining the contents of the stomach of a salmon (8 lbs. weight) at Carnlough, in May, 1842, I found the remains of sand-eels, and I have been informed that salmon have in various instances been caught in Dundrum Bay (County Down) upon long lines baited with sand-eels.—In Feb. 1851 a salmon, about 4 lbs. weight, was taken in this manner off the beach at Newcastle, and was very innocently offered for sale to the officer of Constabulary, who immediately gave information to the magistrates, and the vendor was summoned for the offence of killing salmon during the close season; but, as the fish was evidently taken accidentally, the captor was acquitted.

Mr. Sinclaire states, as the result of his observations, that the pea or ova of other fishes constitutes the chief food of the salmon.

"One of the finest fish of this species, which we have ever seen, was received from Glenarm yesterday evening, at Mr. B. Meenan's, Montgomery's market. It is forty-three pounds weight, forty-two inches long, and two feet two inches in circumference."—*N. Whig*, July 4th, 1843. The above is correct, I saw the fish. H. J. Dr. R. Ball says, in reference to the size of this species, "the largest I ever saw taken in the Blackwater weighed 52 lbs.; two precisely similar were caught at the same time."

With reference to the supply of salmon, as compared with former periods, Mr. Meenan says they are as plentiful as ever, but the Bann fishery greatly lessened by the Scotch mode of fishing; a bag-net being run at every creek on the coasts. The largest salmon he has seen weighed forty-six pounds, and was taken at Glenarm; but he has heard of some of the weight of sixty pounds being taken at Ballyshannon, in season from 1st January to November. Seven tons have been taken at the Bann at one haul. He knows a ton and a half is often taken at Carrick-a-rede; and he has been told of three tons being caught there. The price is up one-half since "ice and steam" came into play. From 15th June to November the average price is sixpence per lb., fifteen pence before that period.

The following notes respecting the salmon fisheries on the Lower Bann, near Coleraine, were made by my friend Mr. R. Patterson, in 1826:—

"In the year 1790 the weight of the salmon taken at the Cranagh and Cutts exceeded 120 tons; in 1796, 100 tons; in 1798, 108 tons. Several years ago, the immense number of 1500 were captured at a single haul. At that time they were sold in Coleraine and its neighbourhood for three farthings per lb. It must be recollected, however, that then very few fish were exported, and as packing in ice was unknown, they were all salted, which would diminish very materially the demand. During the

last twenty years the quantity taken has decreased very considerably, partly owing to the number of machines on the different waters, and partly to the practice of fishing too late in the season, which was pursued for some years. It is pleasing, however, to state that they are now gradually improving. During two days I passed at the Cranagh in 1823, the value of the fish taken exceeded £400. On the 5th of July, 1824, 400 salmon were taken at one 'haul' of the nets, and at the next above 350. The entire weight taken that day amounted to two tons; this quantity, at the average English price of 1*s.* per lb., would amount to £242."

Salmon. August 16th, 1851.—The gamekeeper in Tollymore Park assures me that he has taken some here up to the weight of twenty-seven pounds. This year he took a few up to sixteen pounds. I was told they are taken of the latter weight in the inner bay of Dundrum.

The Rev. G. M. Black knew of a salmon, three pounds weight, being taken in the sea of Annalong, the bait being a piece of mackerel. The fishermen told him they had known an instance of this before.

A salmon of the weight of twenty-three pounds and three-quarters is the largest that a fisherman of old standing has known to be taken in Dundrum Bay: the run is too small and shallow for large fish.

The following notes have reference to the river Lagan, near Belfast, described in a letter written in the year 1635, as "a pleasant river which abounds with salmon." *

"Mr. Sinclaire states that the river Lagan was once a capital salmon river, not only supplying the town of Belfast and neighbourhood, but that quantities were exported. His father used to ship them from it to the Continent, the Mediterranean ports, &c. This fishery was destroyed by the formation of the canal—being excellent until that period. There were three fishing stations between Stranmillis and the Long Bridge of Belfast. I have heard a relative say, that previous to the formation of this canal, salmon were so abundant and cheap about Lismoyne, that his uncle's or grandfather's servants stipulated that they should not be obliged to eat it more than a certain number of days in the week."

On 12*th Sept.*, 1844, I saw a salmon, about 18 inches in length, which was taken with mullet in Belfast Bay; and Mr. B. Meenan told me that he had before got similar fish taken here along with mullet.

Bushmills, July 13th, 1842.—This, so far, has been a good season, on account of the fine mild weather. In stormy, coarse weather very few fish are taken here. I saw sixty-seven captured this morning at the cuts, which, excepting a few taken out, were not fished for the last three days; none were large, the river being too low for good fish to ascend. They were chiefly about five pounds weight; the largest did not exceed nine pounds. They were lifted out with large landing nets, occasionally five at a time, and deposited in the boxes to die; they very soon died without any violence being offered. Their chief months of ascending here are June and July; their spawning time, November. In frost, it is said, not one ascends. The manager, Mr. Skelly, who has held the office for twenty years, and whose office was filled by his father before him, is my informant in all these matters. During the whole year the fish are in season, and in the very highest condition. Mr. Skelly knows them to ascend the river, and has occasionally taken them in the sea, with the spawn just ready for exclusion, and, to use his own words, oozing out of them like "linseed oil." The allusion is perhaps to the colour.

* Dubourdieu's Down. Edit. 1802, p. 309.

Mr. Skelly has read the opinions of Shaw, and denies their truth. He has the old notion about their amazingly rapid growth; he can hardly, however, be mistaken about the fry entering the sea when very small in sackfulls; he says they do so when of the length of the finger: the short course of the river may account for this. He states that they have not the dark side-marks of the parr. The salmon cannot be said to be decreasing of late years; but many years back (50) were much more numerous. I saw a number taken likewise in the sea this morning, the largest thirteen pounds weight. *June 18th.*—"Fourteen and a half score of salmon" were taken here to-day in the sea. *June 20th.*—Seventeen and a half score were taken at Port Ballantrae in the sea. *June 21st.*—Thirteen and a half score were taken in the cuts at Bush foot. More salmon have already been taken at the Bush fishery (river and sea) this season than there has been from commencement of the season to the 21st of June any year since 1814. I have been told that a fish weighing fifty-five pounds was taken here last year; and some years ago one of seventy pounds weight. Large fish do not ascend the Bush until the season is far advanced. Eightpence per lb. is the price charged for salmon here this season: it is sent to Glasgow on commission.

Portrush, June 22nd.—I saw a salmon of twenty-seven pounds weight taken in the sea here; it was offered at sixpence per lb., the price charged for the "poaching" captures (large and small) made in the river.

Ballyshannon, July 15th, 1840.—A gentleman whom I met at the hotel here assured me that he had seen two salmon taken here, one of which weighed forty-five pounds, and the other sixty-three pounds; and that a friend of his saw one which weighed upwards of eighty pounds. Colburn, of the hotel, does not credit the weight of the last two. Two days ago, eight hundred salmon* were taken here at the fishery. It is said that three hundred and twenty-nine were taken at one draught, and all large fish, from twenty-five to thirty-four pounds weight. From May 12th to this time five tons of salmon have been taken here; the price in the town is eightpence per lb. The fish are rather increasing of late years; £3000 and £4000 a-year are said to be realized by the lessees. Col. Conolly, the proprietor, derives £1100 per annum of clear profit rent from the fishery, and has it set for three lives.

I extract the annexed paragraph, from Kidd's Companion to Southampton and the Isle of Wight, on account of the similarity between the Southampton river and the Lagan:—

"Formerly the salmon fishery was carried on here [at Southampton] with much success, and a few of them are still occasionally taken. So abundant was the supply, that farm-servants and apprentices used to stipulate with their masters that they should not have salmon for dinner more than twice a-week."

The parr has been mentioned by the following authors:—Rutty says, "Salmulus-Samlet, or Branlin, frequent with us; never above 6 inches long."—Sampson speaks of it as the "Samlet, or Jenkin," least of the genus."—Tighe notes the "*S. salmulus*, Ray, here called guillioge;" and Harris, in his enumerations of the fish found in the Bann, says, "it is here called a Ginkin."—See also Annals Nat. History, vol. xiv. p. 146.

April 25, 1837.—I to-day received from Glenwherry river (County Antrim), ten specimens of the parr, from 4 to 7 inches in length; and at the same time, three specimens of the common trout (*Salmo Fario*) of corresponding size, for comparison.

* Similar numbers were lately taken at one haul at Ballina.

The three most striking characters of the parr, in contradistinction to the common trout, are—its tail being more forked, its having only 2 or 3 spots on the *opercula*, and its want of *dark-coloured* spots beneath the lateral line. The P. fin of the parr is larger, and the hinder margin of its operculum less angular, than in the trout. These two parrs have from 1 to 3 spots on opercula (pre-opercle and opercle); these are generally deep black, but they vary, some being rather faint; on one specimen there is a bright scarlet, in another a faintly reddish spot. They all exhibit, more or less, spots below the lateral line, but these (with the exception of a single dark spot on one), as well as the spots on the line, are scarlet. Some of them have but 1 or 2 spots beneath it; others have them sparingly in two irregular rows. The three specimens of trout have many darkish spots below lateral line.

The remark of Pennant, that "the adipose fin is never tipped with red, nor is the edge of the anal white," can only be considered as generally correct. Two of my parrs do, though very faintly, show red on the adipose fin, and one half of them have the base of the anal fin white; but on the parr it is less conspicuous than in the trout, in consequence of the contrast produced by the adjoining rays on the latter being dusky, whilst on the parr they are so light as to be yellowish, or almost transparent.

Sir Wm. Jardine observes (Edin. Phil. Jour.), that the parr

"takes any bait, at any time, with the greatest freedom; and hundreds may be taken when no trout, either large or small, will rise, though abundant among them."

In the present instance three trout were taken, and ten parr, by fly-fishing, and on several occasions my angling friends have remarked to me, when the day turned out unfavourable for their sport, and bright sunshine came on, that they could catch only parr. I chiefly allude to Glenwherry river.

About an hour after the above was written, I saw in Belfast 31 other specimens of parr and common trout, taken along with those just described. The angler caught yesterday 62 of these fishes altogether in Glenwherry river.

Of these 31, 25 are trout, nearly all about 5 inches in length. I at once distinguished them from the parr, by the before-named three striking characters, and need only further observe that some of the trout had all the spots below the lateral line more or less reddish, though on none were they *all* bright scarlet as on the parr; these spots are, however, much more numerous on the former than the latter. Some of these trout had only from 1 to 3 spots on opercula like the parr, but they were less regularly disposed (on the parr they are generally in a row) and less striking in colour. The white basal margin, from the reason above assigned, is (though not taken separately) a good mark of *S. Fario*. I looked to it in all the 31. Small as these trout are (from 4 to 6 inches), not one exhibits transverse markings, as do all the specimens of the parr, one of these, $7\frac{3}{4}$ inches long, showing them as strongly as the smallest.

When conversing with the man who caught these fishes, he said that he knows the parr from the young trout by its mode of leaping at the fly; it leaps higher, in a more lively manner, and wider of its mark. On inquiring why the parr is so partial to Glenwherry river, compared with others, such as the Six-Mile Water, the Glenavy river, and the Collin Glen river, I found he attributed it to the gravelly shallows of that river. The Six-Mile Water flows over, he says, a soft bottom; and he further observed, that in Galgorm water, or Clough river, a branch of the Main, the parr is very abundant, those streams being likewise gravelly. On remarking

to him, that, in consequence of the preference shown for similar localities, the fish is in some places called *Gravel-ing*, he said that was the name applied to it by a gentleman from the South of Ireland; so, presuming this is the name there given to it, we have in this country two of its English names—*Parr* in the North, and Gravel-ing in the South.

I examined the stomachs of three parr and one trout, all of which were filled with the larvæ of aquatic insects, excepting two or three flies; no crustacea appeared. There was neither milt nor roe apparent in any of them.

Irides of *Parr* and *S. Fario* silvery.

My friend Mr. Thos. Sinclaire, who has been long accustomed to angle in the North of Ireland, and also in Scotland, states that the coloured figures (natural size) which accompany Mr. Yarrell's paper on the Growth of the Salmon in Fresh Water correspond with his ideas of the salmon of every size represented; but he is of opinion that a small fish which is taken in rivers during every month, from March to November inclusive, and which he calls the *Parr*, is a distinct species. He describes it as being of a more robust make generally; more firm and strong than young salmon of the same size; with scales not deciduous as those of the salmon are, and also devoid of the silvery appearance of the "salmon fry." The latter he considers to be always gregarious, and he has only taken them in April and May. Sometimes they rise so frequently and numerously in pools as to render the surface like a sheet of silver; but he finds the *parr* scattered throughout the river in the same manner as the common trout. From the circumstance of his only meeting with what he considers the salmon fry in April and May, he reasons that they are only then in the rivers, although the *parr* are there at all times.

In May, 1842, Mr. Sinclaire brought me, from Cushendall, a few fishes which he called parr, but, in consequence of their having been put into brine, they were unfit for critical examination. They all appeared to be evidently of the same species, and one of them, displaying a black pectoral fin and sharply forked tail, was, in my mind, a salmon (*S. Salar*).

THE GREY TROUT, BULL TROUT, OR ROUNDTAIL, *Salmo Eriox*, Linn.,

Is taken along the coast of the northern half of the island, and not improbably around the entire coast. A specimen captured in sea water, at Killala Bay, was sent to me by Mr. R. Warren, jun., in the autumn of 1851. The first positive notice of this species as Irish was made by me to the Zoological Society in 1837, and published more fully in the first vol. of the Ann. Nat. Hist., vol. xxxv. 7, as follows:—

"SALMO ERIOX, Linn., Bull Trout.—Dec. 3, 1836.—In Belfast market I selected from a basket filled with sea trout (*S. Trutta*), in high condition, three specimens of *S. Eriox*, which were taken along with them in the sea at Donaghadee, in the County of Down. Their length is from 19½ to 21 inches; weight of each about 2¾lbs. Two are males, having the lower jaw very slightly hooked,* the other is a female; the operculum differs much in the sexes; teeth on the vomer of one male and the female three in number, in the other male four; teeth generally much smaller in the female than in the males. Fin-rays, with one or two exceptions, are in the three specimens—D. 14, P. 14, V. 10, A. 11, C. 19.

"In *colour* they are silvery grey, having but few spots (of the form × ×× and purplish black) above the lateral line, and scarcely any below it. Donovan's

* In the Fauna Boreali Americana it is remarked, that "the hook of the under jaw is very decided, even in a young *Salmo Cambricus*," (Part iii. p. 307,) but in the present instance the reverse appears.

Sewen (pl. 91),* with which they are evidently identical, is a very characteristic figure. These specimens differ only from it in having fewer spots below the lateral line—but in this particular they accord not with each other—and in the darkness of the blue he represents being relieved or lightened by a silvery cast.† The tail of the Sewen cannot be called incorrect from being forked, as when unexpanded it appears slightly so in the present specimens, although when fully spread out it is square. The female exhibits over the body and operculum, &c., as many more spots as the males—on her operculum are six round spots, on that of the males two or three. Fins of the female coloured as in the Sewen, but in the males all darker: V. and A. dull pink or flesh-colour in the female; in the males the V. grey for two-thirds posteriorly, the A. entirely dark grey; their other fins merely of a darker shade than those of the female. Irides silvery.

"The ova in the female are very minute, being not more than half the size of clover seed; the milt in the males occupies twice its space. These latter not having any of the red markings said to distinguish the adult male, and the hook of the lower jaw being so slightly developed, taken in connexion with the internal appearance of both sexes, lead to the conclusion that they would not have bred for another year. In the stomach of one was a sand eel (*Ammodytes Lancea*) three inches long, and in another a large piece of the marine plant (*Ceramium rubrum*)."

On seeing these fishes, I recollected having a few days previously observed two very peculiar looking trout in the market (which were called salmon), evidently of this species. One of them, weighing about 6 lbs., had the hooked jaw, denoting a male; and his sides exhibited a series of longitudinal stripes of deep orange; the other was a female, the colour of those above-mentioned, and about 9 lbs. weight.

Florence Court, Oct. 1840.—A fine male fish, 10½ lbs., received from L. Melvin. Small specimens of this species and *S. Trutta*, about 9 inches long, have been taken in the river three miles from Florence Court House, with hosts of *S. Fario*, and on different days.

Oct. 20th, 1840.—One 3 feet 2 inches long, same weight as last, and equally out of condition (a male fish), brought to-day from Beleek, along with a female salmon. The colour of this fish was much the same as last, but the red spots (for in this they were truly red) were differently disposed: in the former, the lower ones became reddish without any pattern; in this they were thrown into circles an inch or more in diameter, and were otherwise patterned like an irregular carpet figure. The spots on back and upper portion are black along the middle, and below it the red appear.

Although this species is occasionally brought to Belfast, it is not of frequent occurrence here.

Oct. 28th, 1840.—I obtained a specimen in Belfast market: it was taken in the sea at Donaghadee, and without any other trout being captured at the same time. Its general form at once marks it distinct from other species of *Salmo*. It is long and narrow, and of a more equable breadth than any of the others; it is, however, hardly so much so as Agassiz' female "*S. Salar*." The pointed head mentioned to me by Agassiz, as a character of this species, is obvious here. Its length is 23 inches; weight only 3¼ lbs., though in good condition before dissection. I concluded it to be a male, from the hook of lower jaw, which is extremely slight, barely rising ⅛th of an inch above the gum anterior to the adjoining teeth.

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* Whether Sewen be applied only to this fish, or to *S. Trutta* also, I have no means of judging; I can only offer an opinion on Donovan's fig.

† This observation is perhaps superfluous, as different copies of the work may not invariably exhibit the same shade of colours.

Above lateral line are a few × spots, as described in my other specimens, but on opercle are several round spots, and a few, nearest to the eye, have a tinge of brownish red. Contiguous to the lateral line, not more than ¼ an inch above it, and extending to an inch below it, are pale brick-red spots, but these are few and widely separated in some places, whilst in others several are clustered together. On dissection it proved to be a male, and had the milt so developed that it would certainly have been shed in the present season. I was pleased to perceive this in connexion with the small hook on lower jaw; it goes to prove what has been stated, that the "hook" is not in any way used in excavating a hole for the ova of the female, but that this operation is effected with the tail.

January 28th, 1842.—Dr. M'Donnell sent me a trout about 16 inches in length, which he had received from Mr. Crawford, Crawfordsburn, who wished to know what it was: it was a *Salmo Eriox;* on one side was a circle of scarlet spots nearly the size of a half-penny, and on the other were two such circles—the marking of the breeding season. I presume it was a male, but the intestines, &c., had been taken out.

On *February 1st*, 1842, I received another specimen, 2 feet in length, from the same quarter; a most characteristic *S. Eriox* in form and colour —long, narrow, and uniform in depth; a grey colour with a few round black spots only along the sides.

Dr. M'D. says this fish appears about the river at Crawfordsburn in winter only, when the stream is large: it is called "Salmon Trout" there. The same gentleman sent me a specimen from the Nanny Water (County Meath) in April, 1844.

February 27th, 1849.—In Belfast market I saw a *S. Eriox* to-day, 2¼ lbs. weight, which, as it laid on the bench with several of *S. Trutta*, looked different from them only in being more equable in breadth—having the dorsal and ventral profile less arched. The caudal fin certainly was more square at the end and of a coarser structure, but the specimen was *as silvery and had as many spots as the S. Trutta;* in both of which particulars the other specimens that I obtained differed (see dates respecting them).

The considerably larger adipose fin, together with the graceless outline and the coarse rays of the dorsal fin, proved the specimen to be *S. Eriox*. The only difference in colour of body and fins between it and the *S. Trutta* (of which there were several both larger and smaller than it) was the mere extremity of its caudal fin being lightish coloured instead of dusky, and its dorsal fin wanting the many spots towards the base that *S. Trutta* exhibited. Although wanting a specimen of *S. Eriox* to send Mr. Yarrell, I did not purchase it, as it was the least decidedly marked of any specimen I had seen. It was taken in the sea.

July 20th, 1848.—One 18¾ lbs. weight, caught in the sea near Donaghadee, was brought to Belfast market. It was the largest which the fishmonger ever saw: he has seen two others of 18 lbs. He accurately described to me the differences between *S. Eriox* and *S. Trutta*.

March 16th, 1849.—Numbers of *S. Trutta* and two of *S. Eriox* in Belfast market, from Ballyhalbert and Ballywalter; a few *S. Salar* taken with them from 5 lbs. down.

S. Eriox. The larger weighed 9 lbs., and was 2 feet 4 inches in length: it was not in high condition, as the weight implies.

S. Eriox. One which I bought, 22 inches long, weighed 4 lbs. It is of singular uniform breadth throughout, and of a greyish instead of a whitish silvery hue, like *S. Trutta*. It proved to be a female, the ova being the

size of ordinary clover seed. I was pleased to have proof of its food; in its stomach a little of *Ulva Linza*, Linn., was found; one plant from root to top being perfect.

March 16th, 1850.—A very fine one, 5 lbs. weight, taken with a number of *S. Trutta* at Donaghadee, was brought me. I saw a small one a few days ago which had been caught there.

On *2nd August*, 1851, I obtained an example of this fish at Newcastle, County Down, weight 3½ lbs.—some, if not all, of the trout called "Dolochan," at Dundrum, are (from the descriptions given) apparently of this species. They are taken up to 12 lbs. weight, and are said to ascend the river as regularly as the salmon.

THE SALMON TROUT,* *Salmo Trutta*, Linn., *Salmo albus*, Flem.,

Is common around the coast. I have examined specimens from all sides of the island. Belfast market is supplied from spring to autumn with this species, taken in the sea, whence all that I have seen taken, no matter at what season, were in good condition. It ascends the tributaries, great and small, of Belfast Bay.

On examination of a specimen of *S. Trutta*, taken in the Lagan Canal, on 16th February, 1837, with Scotch specimens of the herling, *S. albus*, sent to me by Capt. Fayrer, R. N., I found a perfect agreement between them.

In the stomach of the Lagan fish were a gammarus-like crustacean, a leech, and the remains of larva-cases of the *Phryganea* (caddis-worms).

March 2nd, 1837.—There was a basketful of *S. Trutta* in Belfast market from Donaghadee, where this species is abundant; their average weight about 1½ lb. I bought one of this weight, and on opening it neither milt nor roe appeared. In its stomach were the remains of seven or eight sand eels from 2 to 3½ inches long. I examined three which were perfect, and found two of them *Ammodytes Lancea*, and one (3½ inches long) the *Amm. Tobianus:* it contained also a full-grown *prawn;* in its mouth were some *confervæ*.

July 11th, 1838.—I received a specimen of the *Salmo Trutta*, 9 inches in length and in high condition, from Macpherson's dam, Old Park, near Belfast, where they are said to be numerous. Its roundness on the back and greyish green colour, as described by Jardine, are very well marked. The person who brought it to me caught similar fish in the Lagan last March. Comparing it with the Scotch specimens of the herling, I see no difference.

March 31st, 1846.—I saw several which were taken in Belfast Bay, about two miles and a half from town, weighing from two to three pounds each. A few are commonly taken in the mullet nets. Mr. Meenan says he sometimes gets in one day three or four cwt. One hundred and a half is sometimes taken by one boat in a day,—all taken early in the morning, before day-break, by drawing the sandy bays. The salmon trout is chiefly procured at Donaghadee and Ballywalter, but is met with all round the North-East coast. Taken from March till November; the largest weighing fifteen pounds, often ten and twelve pounds; average size two and a half pounds. Great numbers are taken at the Cranagh cuts, Coleraine; but they do not at any season average more than one pound weight. (One of fourteen pounds weight is said to have been taken in

* Commonly called "White Trout," or "Sea Trout."

the Basin some years previous to 1842.) Sells at from five to eight pence per pound.

The largest specimen of which I have a note was taken at Wexford in 1849, and obtained by Dr. Ball. It weighed 17¼ lbs.

From a basketful of salmon trout taken at Donaghadee and brought to Belfast market, on 28th March, 1835, I selected the smallest, which weighed 1¼ lb. (and cost 8*d.* per lb.), for examination.

Its length is 15½ inches; breadth 3¼ inches; B. 10 at one side, 11 rays at the other; D. 1|10 (the last double from base); P. 13; V. 1|9; A. 9 (the last double from base); C. 19.

Colour. Head marked irregularly with blue and green; back faintly marked with the same colours; above and a short way beneath the lateral line are irregular black markings, which can hardly be called spots (some of these are similar to the markings on Donovan's Sewen (pl. 91), but are more irregular; it has about as many spots above lateral line, as this fig., but they are more irregularly disposed; it has not so many below lateral line as this figure, it differs from it in form); from a little above the lateral line, and thence to the belly, the scales are of the most brilliant silver; on the upper portion they have that fine azurine tint which those of the Pollan of L. Neagh exhibits; under parts of the purest white. D. fins very pale dusky green; C. the same; A. transparent white. V. same, except at inner base, where they are tinged with iridescent green and blue, and above that with purplish red, which colours also prevail at inner base of pectoral fins; these fins are uniform, transparent white on under side, the upper side being partially dotted with black.

Irides, silvery, with tinge of yellow, pupil black.

Tail, slightly forked.

Upper jaw, longer than under.

Head, delicately formed, and sloping equally on upper and under side.

In colour it approaches Donovan's Sewen (pl. 91) more nearly than any other figure I have seen; but in form, especially of the head, it totally differs from it.

The only Lough Neagh *Salmo* to which this specimen bears any resemblance is the sea trout, so called there; but the Lough Neagh specimens of this trout that I procured in September had no approximation to this Donaghadee fish, in regard to brilliancy of colour or deciduousness of scales. Is this a seasonal difference?

On showing this fish to Thomas Sinclaire, Esq., he recognised it as unquestionably the species of *sea trout* which he used to catch in the Lagan, from August to December, but chiefly after the November floods. For many years he has not heard of it being taken in the Lagan. He has seen his father take it in Glenarm river in July.

The Common Trout, *Salmo Fario*, Linn.,

Is common throughout the lakes and rivers of Ireland.

July 19th, 1838.—Stomachs of two taken in the Lagan, examined and found to be filled completely, chiefly with insect larvæ of many kinds, some flies and *Gammarus aquaticus*.

A friend informs me that he has known a small river in the North of Ireland fished by poachers for the extent of three miles, by means of a net formed of a couple of blankets fastened together.

A few weeks ago there were a dozen trout caught at Wolfhill, by some lime being put where they were; instantly, on their coming to the top of the water, they were captured and put into a tub of pure water, and con-

veyed with all haste to the spring-dam. They were all in the highest condition when taken, but a few days afterwards I noticed one of them having about the gills and fins several white downy-looking excrescences (not unlike the hard and pearly tubercles on the stickleback), some of them larger than a marrowfat or the most gigantic pea. The general colour too of the fish was paler, and its motion through the water dull and sluggish; in a few days it died, as well as two others which were similarly affected. I have before observed this disease in trout, and in the present instance have remarked that the growth of the excrescences is very rapid, quite that of a mushroom. I recollect many years ago having a little lime put under the arch, between the two dams, and the very moment the trout, fifteen to twenty, came to the top, they were plunged into a large tub of spring water; yet every one died almost immediately.* Note of October 15th, 1832.

Salmo Fario of Dr. Ball's, with short upper jaw, just as figured by Yarrell, ii. 59. It is seven inches long, opercle very angular and spotted, dorsal fin marked over with round black spots, first ray of fin white, as in the char, immediately succeeded by a black line, remainder pale grey. The upper jaw has a singular appearance, being doubled in with all the teeth in it, as if it were perfect. This specimen was taken in a pond at Sally Park, near Dublin; the pond is supplied by a mountain-stream. Dublin, note of 1838.

Deformed trout, taken by R. Callwell, Esq., in a river flowing from Loch Ruthen, half an English mile from the lake, one of three hundred and twenty taken in three days, during the second week in September, 1839.

Trout with malformed head, just as figured by Yarrell, brought to the Museum, from a small stream near Doagh, County Antrim, where a second one of larger size was also taken, May, 1844.

In the river at Glenlark, in the Munterloney mountains, County Derry, Mr. Sinclaire states that the water and stones are deeply tinged with a rust colour, of which the trout likewise partake. Their flesh is very bad, and of a metallic flavour, as Mr. Sinclaire and his friends had evidence; so bad are they that the country people will not eat them, and as they are not fished for, the river abounds in them.

March 21*st*, 1837, I purchased a beautifully marked trout, which was taken with a fly in the river at Whiteabbey, on the northern shore of Belfast Bay.

Its length is fourteen and a half inches. Colour above lateral line, very pale yellowish brown, glossed with silvery lilac between the spots, with which it is densely covered; these are large, round (no X like figures), and rich brown, three spots on posterior part of lateral line are dull red, and two below it of this colour; below the lateral line the spots do not extend far, but are close together just beneath it. These spots are rich dark brown in the centre, bordered with lighter brown, and each exhibiting a white ring exterior to this, which gives every spot a beautifully ocellated appearance; colour from lateral line to the belly is a pale yellowish brown; belly white, faintly glossed with silver anteriorly; D. fin very much spotted all over; P. and F. marked with dusky grey and yellow; A. dusky or dark smoke grey, tipped with dull yellow; C. olive brown; back, when viewed at a little distance, so dark as to appear black.

Eye, larger than I have seen it in any trout of similar size; pupil, dark

* Probably the spring-water was too cold.—*R. Ball.*

blue, very dark silvery colour on lower half, upper half clouded with brown. This is different from the colour of any eye in the species of this genus that I have remarked, they are generally whitish silvery. It proved a female on inspection, and containing ova (?) of every size, from three lines in diameter downwards to very minute, and these were loose, apparently as if part had been shed. I never before saw this variation in the size of ova in any fish; the very largest size in this were clear, and all the smaller opaque, of a dull stem-colour, and exhibiting blood-vessels in them. The stomach contained the remains of small crustacea, an insect larva, &c.

The Gillaroo Trout.

The coats of the stomach of other species of *Salmones* than *S. Fario* (of which *only* the Gillaroo is set down as a variety) become muscular from the same cause. I have seen *S. ferox*, from different localities, with a muscular stomach, and these examples were called Gillaroo trout, by persons who distinguish them from the ordinary state of the fish, believing them to be a distinct species.

1838.—Dr. Drummond sent me the contents of the stomach of a trout, about eight inches long, from Lough Neagh. They consisted of *Limneus peregeri* of small size, and *Valvata obtusa*, but more of the former; they also contained a few *Cyclas cornea*. I reckoned fifty of these shells, and divided the remainder into parcels of a similar number, and found that the whole amounted to a thousand.

The stomach of another trout from Lough Neagh, examined by me, was half filled with *Limneus peregeri;* the other half of the contents comprised flies and coleoptera, which it must have taken on or above the surface; and of sub-aquatic insects of various kinds. The stomach also contained *Gammari*.

The Gillaroo Trout.

December 1st, 1849. W. R. Wilde, Esq., tells me that in September last he caught a number of these in Lough Bofin, within four miles of Oughterard, between that and Clifden. The first which was caught was pointed out to him as a Gillaroo by his boatman, who knew it from the markings, without feeling the stomach. He said he recognised it by the "invisible marks" above the ventral profile. These marks Mr. Wilde describes as resembling dirty finger-marks. The boatman examined a number of these trout, and found they were Gillaroos, with hard stomachs and shell-fish in them. All the fish were of a very small size.

Gillaroo trout are found in the Shannon, in Lough Corrib, and Lough Mask. *Newenham's View of Ireland*, 1809.

Nimmo has taken Gillaroos in the Galway lakes, with shells in them, from April to August. With a fly he has caught those with thick stomachs containing shells.

Mr. R. M'Garry informs me, that in Lough Neagh it sometimes attains 12 lbs. weight; he has never seen one under 1 lb; he says it is very partial to flies, with which he has seen the mouths of those taken filled; he has never known it to be caught with any bait excepting the fly, though all the other species of trout are so taken.

The fishermen distinguish them at every age by form, markings, and by the hardness of the stomach or gizzard as they term it. It is partial to a rocky bottom, takes a worm-bait, but may also be captured with artificial fly.

It does not occur in the Baren.

One which I got was taken in the eel-net at Toome, the other two between Shane's Castle and the Six-mile Water. These three, and one I saw in Belfast market, had large scarlet spots, ¼ of an inch in diameter, from lateral line towards the belly, which partook more or less of a golden colour. None of the other trout approximating these in size were coloured at all like them in either of the above characters.

The fishermen consider them inferior to the other *Salmonidæ* for the table.

March 24th, 1835.—I purchased in Belfast market a specimen of this fish from Lough Neagh; its dimensions, &c., are as follows:—Length, 23 inches; weight, 4½ pounds; depth, 5¼ inches. B. 11 at one side, 12 rays at other; D. 2|12; P. 14; V. 9; A. 2|11; C. 19. The two last rays springing from same base, in D. and A. fins, are reckoned as 2.

Irides, silvery, clouded with black; colour, similar to what it is in autumn, but not quite so intense, having several large scarlet spots on and below lateral line. Towards the belly it is of a rich golden colour, tinged with a faint blush of rose colour; under parts white, becoming deeper in colour towards the vent, where it is cream-coloured. D. fin spotted over; C. of different shades of brown, with upper portion spotted, terminated by a regular band of yellowish brown; P. fins tipped with amber brown; V. and A. tipped with yellowish brown; upper jaw projects over lower when the mouth is closed. I took two specimens of *Paludina impura* from its mouth.*

August 27th, 1836.—Mr. Hyndman states that a Gillaroo from Lough Neagh, opened by him to-day, contained ova the size of small peas.

April 8th, 1835.—I purchased a Gillaroo trout in Belfast market of 1 lb. weight, which was caught in Lough Neagh. Its length is 14 inches. Breadth, 3½ inches. B. 11 at one side, 12 at the other; D. 2|11 (last ray double from base); P. 14; V. 1|9; A. 2|10 (last ray double from base); C. 19. Irides, silvery tinged with yellow, very faintly clouded with black. Body of fish same colour as usual, though scarlet spots however appear. The roseate, golden colour of this specimen, below lateral line, is, as in all other specimens I have seen, quite peculiar; head spotted over the top. P. and V. fins of an amber colour, A. fin exhibits a tinge of pale amber, C. not regularly banded as in last specimen: see bottle for contents of stomach which was opened in London. Vertebræ 54. April 25th, 1841. My attention was arrested, in passing through the market, by a Gillaroo trout, its aspect, with the deep golden sides (lower portion of), being very conspicuous. Its small teeth too were displayed. I purchased it for the Museum. It is two feet in length; from the æsophagus to the anus it was entirely filled with *Paludina impura* and *Valvata obtusa*, they nearly filled a large tea-cup. Contents of the stomach very thick, fish very fat, the cœca were imbedded in actual fat.

Oct. 18th, 1836.—I examined the contents of the stomach of a Gillaroo, put up for Dr. Scouler, and found it to contain only (excepting a minute pebble) specimens of *Gulnaria lacustris*, which were of middle size, and upwards of eighty in number.

Oct. 3rd, 1837.—I bought a Gillaroo of seven pounds weight from Lough Neagh. It is 27 inches long and 6 inches deep. D. fin begins 11½ inches from snout; V. 1 inch behind it; Adipose fin 1 inch 10 lines long. On the left-hand side it has but four scarlet spots, which are on the hinder

* This is the specimen I gave Mr. Yarrell; he has figured it.

half of the lateral line, and three smaller spots beneath them; they are of sealing-wax red, just the same on right side; two uppermost spots on adipose fin are scarlet, all the other spots on this side have a yellowish brown ring round them, with a whitish marking again surrounding it, rendering them beautifully ocellated. Upper third portion of body, dull stem yellow; central third, rich gold of metallic brilliancy; and lowest third of a rich "buff orange," or pale salmon colour; extreme base, whitish buff. Irides, silvery, clouded with brown. The general colour of the right side is more uniform than above described, but lying on this side may have been the cause. On dissection the stomach and canal were found quite empty, excepting the ordinary thick mucus-like matter. The milt was of the thickest consistency. The vertebræ were fifty-six in number.

Nov. 26th, 1840. Two fish, judged in the market from their hard stomach to be Gillaroos, were brought me. They were both *Salmo ferox*.

The Great Lake Trout, *Salmo ferox*, Linn.,

Found throughout the larger lakes of Ireland; attains upwards of 30 lbs. weight; is the common *Salmo* of Lough Neagh: particularly remarked in this locality a century ago, and thought likely by authors to be identical with the *S. lacustris* of the Lake of Geneva:—see Proceedings Zool. Soc. 1835, p. 81.

Florence Court, Oct., 1840.—Lord Enniskillen considers this fish the common trout of Lough Erne, as I consider it of Lough Neagh. He has seen one of twenty-eight pounds weight taken there. He caught it in Lough Melvin, Oct. 19th. A male fish three feet long, and weighing twenty pounds, was caught in the neighbourhood (if in condition it would have weighed twenty-six pounds); it was about one foot in depth, and densely spotted from back to very near the belly; the lower spots reddish.

Mr. M'Calla only knows this fish as found in Lough Corrib. (1840.)

Ballyshannon, July 15th, 1840.—A gentleman living at Lough Melvin told me that trout are taken there of thirty-two pounds weight; doubtless of this species.*

Salmo ferox. Sept. 22, 1836. *Nov.* 24, 1837.—Many *S. ferox* of medium size in Belfast market; they were in bad condition, and many ova the size of the largest peas were scattered over them. For Dr. Scouler I bought two specimens (male and female) of similar size, weighing together 19 lbs. The marking was very different on the two sexes, the female being of a silvery grey, *densely* covered over with black spots, the male not having half the number of spots, and which were bordered, chiefly the lowest ones, with a ring of dull orange. The general colour of this fish was very different from the female, the lower part of the sides and belly being of a rich salmon colour.

On dissection there was not anything found in their stomachs but the backbone of a fish, which must have been about the size of a full-grown pollan; the roe in female was the size of small peas and weighed altogether 17 oz.

The stomach of a small *S. ferox* examined to-day contained remains of insects.

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* A specimen of *S. ferox*, sent to Dublin University Museum by one of the editors in 1854, weighed 32 lbs.

Mr. Dugan (fish vender) has frequently had specimens of *S. ferox* for sale 30 lbs. weight, but never knew one to exceed 31 lbs.*

The following is the description of Dr. Scouler's specimens:

Male, length 32¾ inches; D. 14 (including very small anterior one); P. 14; V. 9; A. 11; C. 19.

Female, length 30½ inches; D. 13 (including very small anterior one); P. 14; V. 9; A. 12; C. 19.

Teeth are considerably stronger in the male than female; these on vomer extend on both 1¾ inches.

Operculum differs much in form in the two sexes—in the female approaching in roundness to that of the salmon.

From eye to snout the difference in length is great between the sexes, being much longer in the male.

Spots on operculum and sides of the head in both sexes round (more numerous in female); which form they also are generally on tail of female when they appear on its base and upper portion only—no spots on tail of male. On D. fin of male spots roundish, on D. fin of female longish, oval; on sides of male fish, the spots are rudely roundish; on sides of female they are altogether different, being all rudely formed thus, X^w sometimes two or three X's being joined. *Longest D. ring* is the 6th in both specimens, and not "the 3rd," as stated by Mr. Yarrell; it is certainly the 3rd of the conspicuous rays, but in reckoning the very short anterior ones which make the total number 14, it is the 6th, or first branched or doubly bifid ray. In the scales of the Dolochan † and male *S. ferox* there is a difference, those of the former appearing (on the fish) more elongated and more regularly rounded at the free edge, those of *S. ferox* being very irregular in outline at the free edge: those towards the tail chiefly alluded to.

Oct. 19, 1836.—I examined six specimens of *S. ferox*, from 10 to 12 lbs. weight, and found the markings of the sexes as above described; four of them were males, and had the dull orange rings round spots below lateral line.

Oct. 11, 1838.

1. *S. ferox*, milt maturely developed, stomach empty.
2. Many-spotted one; 13 inches long; milt maturely developed, stomach empty. Cœca 35, and tolerably uniform.
3. One 14½ inches long, milt mature; stomach contained one Mysis-like crustacean.
4. 14¾ inches long; milt mature; stomach contained some Mysis-like crustacea, and a few scales like those of pollan.
5. 17 inches long, filled with ova about full size; stomach empty, 33 cœca, some long and some very short.

Lough Neagh Trout, Oct. 19th, 1838.

Salmo ferox 18 inches, male, stomach matters indistinguishable, cœca 34.

Salmo Trutta 14 inches, female, filled with ova of pea size, stomach matters indistinguishable.

Salmo ferox	13	inches, male, stomach empty, cœca				36.
Ditto	12⅓	—	—	—	—	39.
Ditto	12½	—	—	—	—	49.
Ditto	12	—	—	—	about	45.

* In Sampson's Londonderry the great trout of L. Neagh is said to reach 50 lbs.

† Specimen from Tollymore Park.

The cœca in the above were accurately reckoned, so that in the six specimens they vary in number from 34 to 49.

Oct. 26th, 1838.—I received from Lord Cole a female specimen of this fish (apparently from 10 to 12 lbs. weight) taken in L. Erne. Lord C. remarked in a note relative to this specimen sent to me, that a similar fish of 12 lbs. was taken about the same time. My specimen was 2 feet 9½ inches long; chiefly beneath the lateral line were many × × × like markings; above it they were generally round, as all were on opercula. In the market to-day were several Buddaghs from L. Neagh, male and female, of great size, some 14 lbs. weight. On looking over them, I saw that the males had nearly all the spots round, but the females had all, at least a few, and some many, indeed the half, of the spots either single crosses ×, or a combination of them. Some of these had spawned, others had the spawn just ready for exclusion, as it was in the L. Erne specimen. The tail of this individual was obscurely lunate when unstretched, but when fully expanded was convex. I am satisfied that there has been much confusion on this point by authors; we see that even in the same individual it is reversed according to the way we view it; whether in repose (*i. e.* of death) or expansion. The stomach of this fish was empty. The cœca 45 in number. The ova weighed 21 ounces. To approximate the number of ova in this weight, or to see what a fish of about 11 lbs. total weight would produce, I weighed one ounce of the ova and reckoned their number, which was about 220. This number to 21 ounces (and the ova were all similar in size) would be 4620 ova *in toto*.

I could not but be struck with the disparity in several points of view between this fish and a char, from Lochgrannard in Scotland (*S. Umbla*, Linn.), which I examined on the 20th instant in a similar way, and the ova, just in the same way, ready for exclusion.

Thus a char of 7½ inches long, which weighed altogether 2¼ oz., and its ova singly half an oz. and 1½ drachms—here the ova were two lines in diameter, and in total number but 482, or $\frac{1}{10}$ less than that of its congener the *S. ferox*. *Vide Journal, Oct. 4th*, 1837.

August, 1839.—Mr. Jarvey of Glasgow, who has fished much in Loch Lomond, states that there is a trout there, called the *powan-eater*, which he agrees with me is the *S. ferox*.

Swift, in "a dialogue in Hibernian style between A and B," makes A inquire—"What kind of man is your neighbour Squire Dolt?—B. Why, a mere *Buddagh*. He sometimes coshers with me; and once a month I take a pipe with him, and we shot it about for an hour together."—*Scott's Swift*, 2nd ed. 1824, vol. vii. p. 156.

On inquiring from Dr. M'Donnell the meaning of *Buddagh*, he replied it meant "a big, fat fellow."

In writing a history of *S. ferox* (see Mag. Nat. Hist. vol. v. p. 318), Mr. Robert M'Garry tells me that "Buddagh" from ten pounds upwards are taken in Lough Neagh with night-lines, baited with a pollan or perch; caddis-worms are successfully used in the capture of all species of trout but the Gillaroo, which neither he nor any of his friends, who were the regular fishermen of Lough Neagh, ever took in this way, though they have occasionally taken it with the fly.

Measurements of a Lough Neagh *Salmo ferox* kindly made for me by Professor Stevelly, Sept. 27th, 1848. He saw it at or near Dungannon.

		Feet.	Inches.
"*Girth*,	between eye and mouth	1	$2\frac{3}{8}$
——	back of gills	1	$6\frac{1}{8}$
——	middle, just in front of dorsal fin	1	$9\frac{5}{8}$
——	setting on of tail		8
Length,	extreme from hook to tail	3	$2\frac{3}{8}$
——	head from hook to back of gill		10
——	tip of nose to front of dorsal fin	1	$4\frac{1}{8}$
——	front of dorsal to front of caudal		$11\frac{5}{8}$
——	tail		$5\frac{5}{8}$
——	mouth		$4\frac{6}{8}$

Weight 23 lbs. It was lank, though the flesh was firm, and had evidently milted."

Salmo ferox. *Feb. 10th*, 1838.—Mr. Adams remarked to me, that in October it is an extraordinary sight to see the large Buddaghs on the spawning beds in the river Maine; from the first bridge for some distance up the river he has seen them so close together with the tail and fins above the surface of the water when it was low, that one could apparently walk across dry upon the fish; the number is extraordinary. He thinks all the large fishes keep to this part of the river contiguous to the mouth, but he has heard of the smaller ones ascending to spawn as high up as Broughshane. On inquiring how he knew they were not salmon, he replied that their season was later than the Buddaghs.

Salmo ferox. *August 15th*, 1845.—I saw in Belfast market the finest male fish of this species, *i. e.* of the greatest depth relatively to length, I ever saw: it was from Lough Neagh, was in length 27 inches, girth $16\frac{1}{2}$ inches, weight 16 lbs.

Swift, vol. xix. p. 144, old ed. of 20 vols. Lady Howth to Dr. Swift, August 6th, 1736.—

"Since I began this there came in a trout; it was so large we *had it weighed;* it was a yard and four inches long, 23 inches round; his jaw-bone 8 inches long; and he weighed $35\frac{1}{2}$ lbs. My Lord and I stood by to see it measured."

"Swift does not give the locality; somewhere in Connaught evidently, and the address given for him to write is Turlevaghan near Tuam." E. G.

Salmo ferox. *Ballochmorrie, Sept.* 1843.—Mr. Wason has seen taken of large size in Loch Lomond, and states that it is found in Bala lake in Wales: he describes it admirably, so that I feel certain of his correctness, and to my surprise mentioned that it is there called *Buddagh;* he had never heard of the same fish, or indeed any species, being called Buddagh in Ireland.

Salmo ferox.—I saw two of these with Surgeon Wilde, from Lough Allen.—Dublin, Nov. 1839.

Salmo ferox. *August 31st*, 1848.—I saw two males from Lough Neagh in Belfast market, one of which was 23 lbs. and the other 28 lbs. weight. The latter was no longer than a fish of less than half the weight, but as it lay on the board was about one foot in depth.

Lough Neagh Trout.

May, 1851.—I think I have before noted that Mr. B. Meenan has seen trout from this lake 33 lbs. weight, and that Sir William Verner told him he caught one there of 36 lbs.

June 29th.—I saw a male *Salmo ferox*, about 6 lbs. weight, with Mr. Wilde, from Lough Mask. It was considered a Gillaroo by him, and its

stomach, which I saw, was muscular like a Gillaroo's. I saw him open three fresh Gillaroos from Lough Melvin (County Fermanagh) about 10 inches long. They resembled *Salmo Fario* in its ordinary state; one was filled with caddis-worms, the cases of which were covered only with particles of stone. Their stomachs were hard and muscular, in which Gillaroos I saw *Valvata obtusa*, *Paludina impura*, *Lymneus pereger*, which were obtained from the stomach of one Gillaroo.

The Char, *Salmo Umbla*, Linn.,
— *Salvelinus*, Don.

In the Annals Nat. Hist. vol. vi. I published the following notice of this species:—

"Having within the last few years, through the kindness of friends and correspondents, been favoured with specimens of char from various localities in the British Islands, I shall here give some notes made upon them.

"It may first be mentioned, that so late as the years 1835 and 1836, when the excellent volumes of Mr. Jenyns and Mr. Yarrell appeared, neither author had seen any char from Ireland * or Scotland, and the original observations contained in their respective works were necessarily limited to examples of the fish from the lakes of England and Wales. In the Edinburgh Philosophical Journal for January, 1835 (vol. xviii. p. 58), Sir Wm. Jardine noticed the *Salmo alpinus* as taken by his party in Sutherlandshire.

"The chief object of my inquiry was to learn whether, in the lakes of Ireland and of those in Scotland,† from which I could procure specimens, the *S. Salvelinus*, Don., was to be found; and at the same time to ascertain, at least for my own satisfaction, whether its characters have sufficient permanency to entitle it to rank as a distinct species. As they are merely crude unfinished notes that are to follow, I shall here give the result of the investigation, that the reader may be in possession of it without entering into the details. In a fresh state I have had the opportunity of examining char from three localities—Windermere (England), Lough Melvin (Ireland), and Loch Grannoch (Scotland); and, either in spirits or preserved dry, from nine other lakes in Ireland and Scotland. The examination of these examples leads me to believe that the *S. Umbla*, Linn., and *S. Salvelinus*, Don., are but one species; one, however, that, like the *Salmo Fario*, is subject to extraordinary variety. In one lake the male fish can at a glance be distinguished from the female either by colour or by the many characters which are comprised under 'form.' In another, so similar are the sexes in every external character, that without the aid of dissection they cannot be determined. In size we find the species ordinarily attain twice the length and several times the weight ‡ in one lake that it does in another, although the area of their waters is of similar extent; indeed, in some of the largest lakes this fish will be found not to attain near the size it does in some others which are but as pools in comparison—there are, however, various influences which account satisfactorily for such differences. In the form of the body again we find the spe-

* When I supplied Mr. Yarrell with the published localities in Ireland for the char, as noticed in his work, I had not seen any native examples of the species. In the Supplement to his British Fishes (1839, p. 27) this author has offered a few remarks on char sent him by Lord Cole from Loughs Eask and Melvin in Ireland—these are considered to be examples of the *S. Umbla*, Linn., and *S. Salvelinus*, Don.

† The fine work of Sir Wm. Jardine on the Scottish *Salmonidæ* was not at the time announced.

‡ That the quantity of ova produced will vary accordingly, is illustrated by the difference between the number found in the Loch Grannoch and the Lough Melvin fish.

ries, and when in equally high condition, to be in one lake herring-like, and in another approximating to the roundness of the eel. So manifold are the differences presented by the char now before me from various localities, that it would be tedious and perhaps useless to point them out in every case, and consequently this will only be attempted when they are remarkably striking, or particularly demand attention.

"Oct. 25, 1836.—Through the kind attention of Captain Fayrer, R. N., I today received two specimens of char from Loch Grannoch, Kircudbrightshire. On comparing them critically with the detailed descriptions of our British char given by Yarrell and Jenyns, they were found to be both their species, and likewise the *S. alpinus* and *S. Salvelinus* of Donovan's British Fishes.* On thus finding that a small loch produced the two supposed species, and that the examples were of different sexes, I endeavoured to procure a number of individuals for the purpose of ascertaining if the difference were sexual; but this fish is taken during so short a period, that in this object I was disappointed for that year. In a letter upon the subject from James Stewart, Esq., of Cairnsmere, Newtown-Stewart (Wigtonshire), to Capt. Fayrer, dated Nov. 1, 1836, it was observed—'I lost no time in despatching my men early yesterday morning to Loch Grannoch, though I must confess with very slight hopes of success in the object of their pursuit. The char are never found in our lakes before about the 13th October, and in ten days again they disappear—the whole produce of the day's exertions amounted only to four very small fish.' These were not considered worth sending forward. The object of the inquiry being made known to this gentleman, he at the same time remarked—'If my evidence is worth anything, I can give it with great confidence as to the red char [*S. Salvelinus*, Don.] being the male, and the gray the female [*S. alpinus*, Don.] of the same species. I have noticed them frequently, when taken out of the water, eject the milt and roe, and never saw the former from a gray, or the latter from a red fish.' I subsequently availed myself of Mr. Stewart's kindness in offering to procure specimens. On the 17th of October, 1838, 'a dozen of the red and the same number of the gray fish,' caught late that day in Loch Grannoch, were sent me by this gentleman, and being packed with great care, reached Belfast in excellent condition for examination on the morning of the 20th—the following observations were then made upon them.

"These two dozen specimens—of the full size produced in this lake—are all from 7 to 8 inches in length, and the females generally somewhat shorter than the males. The difference in form between the sexes (as proved by dissection), both generally and particularly, is very great. The dorsal and ventral profile of the male fish are alike, the slope being similar from head to tail above and below; the female has the dorsal line much straighter, and the ventral much more convex, than the male—a difference to be expected at the spawning season, and which would be less conspicuous at other times. The lower jaw of some of the males is slightly turned up and hooked; the head in this sex is very much larger in every part than in the female, and the size of the fins is much greater.

"The males, though differing in intensity of colour, may be described as lilac-black or dusky, relieved by a lilac tinge on the uppermost third of the body, viewed lengthwise, from the dorsal ridge, becoming however gradually paler from this part; the middle of the sides is lilac-gray, beautifully and somewhat closely marked with round scarlet spots about a line in diameter; the lowest portion of the sides is of a salmon-coloured scarlet without spots. The head and the dorsal fin are dusky, with a lilac tinge; the pectorals dusky above, tinged with scarlet beneath where they rest upon the part of the body which is of this colour; the ventrals are bright scarlet, with occasionally a dusky longitudinal band inside the margin, which is white; the anal fin dusky, tinged with

* At the Meeting of the British Association held at Newcastle in 1838, the two examples from Loch Grannoch were shown to my friends Mr. Yarrell and Mr. Jenyns, both of whom looked upon them as representing their two species.

scarlet—in all; the ventrals and the anal fin have a white margin, and some have the lower lobe of the caudal fin likewise of this colour: two or three individuals have a tinge of red on the caudal fin. Donovan's *description* of the colour of *S. Salvelinus* agrees admirably with the present specimens.

"The females in *colour* somewhat resemble Donovan's *S. alpinus*: the uppermost third of the body, viewed lengthwise, from the dorsal ridge, is dusky, relieved by lilac, becoming gradually paler downwards, so that the middle of the sides presents a dull lilac—this part is adorned with numerous round spots of similar size to those in the male, but less bright in colour; some however are scarlet, but they are chiefly either pink, or of a dull chalky pinkish hue, as represented in Donovan's *S. alpinus*; the lowest portion of the sides is of a silvery lilac, without spots. The fins are all dusky, with a tinge of lilac; the margin of the ventrals, of the anal, and occasionally of the caudal fins, is white, as in the males—there is no regular spotting on the dorsal fins, as represented in Donovan's figures of his two species. The dorsal fins of the males are nearly all blackish, occasionally towards the tip transparent, which those of the females generally are, and in one or two individuals of the latter sex an approximation to spots may be faintly traced. One only of the males and a few of the females exhibit transverse markings along the sides like the "Par," but not so conspicuously. On *dissection*, the milt (of the ordinary white colour) and roe (of an amber* hue) are found to be just ready for exclusion; a small portion of both has been indeed shed by a few individuals. A specimen $7\frac{1}{2}$ inches in length weighs with the ova $2\frac{1}{4}$ oz., the ova separately $\frac{1}{2}$ an oz. and $1\frac{1}{2}$ drachm. On accurately reckoning these ova, which are 2 lines or $\frac{1}{4}$th of an inch in diameter, they amount in number to 482—this I should say, or 500 for round numbers, is the average produce of the species in this lake. The example was selected out of seven females as of average size, and the ova as of average quantity. The air-bladder is in both sexes of a beautiful reddish lilac colour, like the inside of some species of North American *Unio*, as *U. pyramidatus*, Lea, &c. The stomach and intestines of the greater number (13 were cut up) were empty, but a few contained the remains of food which could not be satisfactorily determined—it consisted either of minute aquatic insects or entomostracous crustacea, more probably the latter. When boiled, the flesh of the male was of a rich salmon colour, that of the female a very little paler in hue.

"Nov. 16, 1838.—To the kind attention of Viscount Cole I am indebted for twelve char from Lough Melvin (partly in the County Fermanagh), sent immediately after capture. In the accompanying note, dated Florence Court, 15th November, his Lordship remarked—'I can procure you any number you wish, as the people are now taking them in cart-loads. The flesh of such as I send is white and soft, and different from what that of char is in any other lough.'

"These specimens, which are in a fresh state and excellent condition for examination, are all from 10 to 12 inches in length, and differ greatly from those of Loch Grannoch, in presenting little or no beauty of appearance. The upper half of the body, in both sexes, is of a dull blackish lead colour, unrelieved by spotting in any but three or four individuals, which exhibit a considerable number of minute spots which are merely of a paler shade than the surrounding parts, and consequently inconspicuous; for more than half the space between the lateral line and ventral profile they are dull lead colour, without any spots except in the individuals just noticed; the lower portion of the sides varies in individuals from a pale to a rich salmon colour, which latter is seen in only one or two examples. The dorsal fins are of a uniform gray and transparent; in some, when closely examined, there appear roundish spots of a paler colour; pectorals dusky gray, darker towards the tips, except at the lower portion, which, partaking of the colour of the part of the body in which it rests, is of a pale pinkish white; ventrals in the brighter-coloured individuals with a white marginal line; in the duller-coloured examples this does not appear, but all

* This is the general colour; some are of a very pale yellow; the ova of both colours are of similar size.

have the two or three first rays and their connecting membrane dusky, and the remainder red, and of a deeper hue than on any part of the body: anal fin partaking at its base of the colour of the part of the body to which it is attached, dusky towards the tip; white margin to the first ray in some of the brighter-coloured specimens only: caudal fin gray, of different shades in all; in the brightest individual varied with red, which appears at the base of the lower lobe.

"The males are generally more gracefully formed than the females, and most of them rather brighter in colour, but there is no external character so strikingly different as to lead to a certain knowledge of the sex; some of the largest finned are females—in the Loch Grannoch char the males had much the larger fins and the sex was as unerringly distinguished by the colour as by the form, the accuracy of the distinction in both cases being established by dissection. Both sexes of the Lough Melvin fish represent the Welsh char.

"The colour of the flesh when boiled was rather pale, between the 'sienna yellow' and 'flesh red' of Syme's Nomenclature of Colours; no difference of colour in that of the sexes. The milt and roe were in these specimens ready for exclusion. The ova, severally reckoned from a fish 11 inches in length, and which had not shed any, were 959 in number, and of a pale yellowish colour—the ova generally, though equally mature, were lighter coloured than in the Loch Grannoch char; they were of the same size, 2 lines in diameter.

"The remains of food were found in only one out of the twelve specimens, and appeared to be a portion of the case of a caddis-worm. The vertebræ, as reckoned in two specimens, male and female, were 60 in number.*

"Lord Cole informs me that this fish is called 'Freshwater Herring' at Lough Melvin, though in the same part of the country the term 'char' is applied to the more ordinary state of the species as taken in other lakes. Its differing from the so-called char, in being an insipid bad fish for the table, and pale in the flesh, is the chief reason of its being considered distinct from it. It will, however, be seen in the following pages, that the term 'Freshwater Herring' is applied to the char of several of the lakes in Connaught, and from one of which an example before me is identical with the fish of the English lakes. Examples of the Lough Melvin char, taken at the same time as those just noticed, were sent by Lord Cole to Mr. Yarrell, and in the Supplement to this author's History of British Fishes (p. 27) are noticed as identical with the Welsh species.

"London, May, 1840.—During the latter half of this month I had the opportunity of seeing quantities of char from Windermere exposed for sale at Mr. Groves', the well-known fishmonger in Bond Street. On examination they differed much from each other in size of fins: their colour was precisely that of the Lough Melvin fish; and, like it too, the flesh of specimens I bought in the last week of the month was pale-coloured and soft—they were now in such bad condition that Mr. Groves ceased to purchase them.†

"So far, the examples of char treated of were examined when fresh. The following, after being preserved in spirits or in a dry state, have been received from the undermentioned Scottish lakes:

"L. Inch—which is one of the localities for char noticed by Pennant. Hence two fine specimens, about 14 inches in length, were kindly sent me, in May,

* The vertebræ reckoned in a male and female of the Loch Grannoch fish were in the former 60, and in the latter 62 or 63; this must be considered an accidental variation.

† When at the inn at Waterhead, at the northern extremity of Coniston Water, during a tour to the English lakes in June, 1835, a number of char from this lake were kept alive by our host in a capacious wooden box or trough, into which a constant stream of water poured. They were fine examples of the species, about a foot in length. Here I was informed that a supply of this delicate fish was always kept up, that the "curious" visitor might gratify his taste at any season by having fresh char set before him at the rate of ten shillings for the dozen of fish.

1837, by Professor Allen Thomson of Aberdeen. They would be called the 'Northern Char.' The stomach of one of these was crammed with food, consisting of insect larvæ, entomostracous crustacea, a small *Notonecta*, or Boat-fly, bivalve shells of the genus *Pisidium*, and minute gravel. Its cæca were 38 in number.

"L. Corr and L. Killin, Inverness-shire. From these lakes examples of char were brought me by my relative Robert Langtry, Esq., of Fortwilliam, near Belfast, on his return from Aberarder, after the sporting season of 1838. The Loch Corr specimen—a 'Northern Char'—is in beauty of colour, and elegance combined with strength of form, the finest example I have seen; it is of a fine deep gray on the upper parts, becoming lighter towards and below the lateral line, about which it is adorned with white spots; on the lower portion of the sides it is silvery, and beneath of the most brilliant red. This specimen is 16 inches in length, and, with another of similar size, was taken by my friend when angling with an artificial fly, on the 25th of September. The other, which was eaten, was excellent and high-flavoured, the flesh firm and red. Loch Corr is described to me as a deep mountain-lake or basin, less than a mile in length, with rocks rising precipitously above it at one part; at another it is shallow and sandy, and here this fish is taken in some quantity when spawning. A beautifully clear river issues from the lake. About fifteen miles from Loch Corr is Loch Killin, situated in the pastoral vale of Stratherrick. Three specimens of char have thence been brought me. They are remarkably different from the L. Corr example, are of a clumsy form, have very large fins like the Welsh fish, and are very dull in colour—of a blackish leaden hue throughout the greater part of the sides, the lower portion of which is of a dull yellow; no red appearing anywhere. So different, indeed, is this fish from the char of the neighbouring localities, that it is believed by the people resident about Loch Killin to be a species peculiar to their lake, and hence bears another name—'Haddy' being strangely enough the one bestowed upon it. This fish is only taken when spawning, but then in great quantities, either with nets, or a number of fish-hooks tied together with their points directed different ways. These, unbaited, are drawn through the water where the fish are congregated in such numbers that they are brought up impaled on the hooks. The largest of my specimens is 16 inches in length, and others of similar size were brought to my friend at the same time—on the 26th or 27th September, when about a 'cart-load' of them was taken. The flesh of some was 'white and soft. They contained ova the size of peas.'* On dissection my specimens were found to be male and female; externally the sex could not have been told with certainty. Their stomachs and intestines were empty. This fish bears a resemblance to the Lough Melvin char, but differs from it in some characters. It will have been remarked that, in accordance with the Irish fish, the sexes present little difference externally either in form or colour, that their flesh is soft and insipid and very pale, and that neither is designated *Char*. The remarks of Lord Cole on the L. Melvin fish, and of Mr. Langtry on the L. Killin one, were in every respect similar. To the latter gentleman the dozen of L. Melvin fish were shown the day they were received, and in colour, &c., they were pronounced just the same in appearance as the L. Killin fish in an equally fresh state.

"In the following instances the Char of Ireland have been noticed:—In Camden's Britannia it is remarked—'Lough Esk, near Townavilly [Co. Donegal], yields the char in great abundance: a most delicate fish, generally about 9 inches long.' (Gough's ed. vol. iii. p. 644.) I have seen a specimen from this locality in Mr. Yarrell's collection; it was supplied to him by Lord Cole, and is noticed in the Supplement to his British Fishes (p. 27) as *S. Umbla*. Smith, in his History of Waterford, p. 208, observes—'In these mountains [Cummeragh] are four considerable loughs, two of which are called by the Irish

* At this very time, the char from the neighbouring Loch Corr were in high condition. This is one out of numerous instances which might be adduced respecting the different period of spawning in contiguous localities.

Cummeloughs, and the other two Stilloges, the largest of which contains about five or six acres. In these loughs are several kinds of trout; and in the former is a species of fish called charrs, about 2 feet long,—the male gray-, the female yellow-bellied; when boiled the flesh of these charrs is as red and curdy as a salmon, and eats more delicious than any trout. It is remarkable that this kind of fish is often found in such lakes situated in mountainous places, as we learn from Dr. Robinson's Natural History of Westmoreland and Cumberland.' In the British Zoology of Pennant (vol. iii. p. 409, ed. 1812) it is mentioned on the authority of 'Dr. Vyse, an eminent physician and botanist at Limerick, that the charr is found in the lake of Inchigeelagh, in the County of Cork, and in one or two other small lakes in this neighbourhood.' In Dubourdieu's History of the County of Antrim (vol. i. p. 119) there is a communication from Mr. Templeton on the char of Lough Neagh, illustrated by a figure; it is here stated to be the same as the char of Windermere, as distinguished from the *S. Salvelinus*, Don. Mr. Templeton here informs us that this fish is taken in L. Neagh 'from the end of September to the end of November in nets along with pollans [*Coregonus Pollan*]. They always keep the deep water, except in warm weather, when they are sometimes found in the shallow. The best time for taking them is in nights that are calm, clear, and a little frosty; the capture of the pollans begins to fail sooner than that of the whitings,'—the name by which the char is known at this lake. It is likewise remarked, that 'the whiting is generally about 12 inches long, though I have seen one of 15.' Again, in his Catalogue of Irish Vertebrate Animals (Mag. Nat. Hist. vol. i. new series), Mr. Templeton observes,—'In a lake of the County of Donegal, near Dunfanaghy, I observed some boys catching small char with lines and hooks baited with common earthworms. * * * In L. Eaghish,* in the County Monaghan, I have known them caught agreeing exactly in their colour with those of L. Neagh.' In two of the localities just noticed the char have become very scarce, it may be, even extinct. In February, 1839, I was informed by Professor Allman, that in the lakes at the source of the river Lee—those alluded to in the British Zoology—celebrated till within the last ten years for their fine char, and which were abundant, that they are not now to be procured, and are nearly, if not altogether, destroyed. Their destruction is attributed by anglers and the people of the neighbourhood to the pike, this voracious fish having much increased of late years; the natural haunts of the pike and the char are, however, very different. When visiting some of the fishing stations at Lough Neagh, in September, 1834, I was told by the fishermen about Crumlin, Antrim, Toome, &c., that they have not known any char to be taken in the lake for at least ten years, although about twenty years ago they were abundant. Subsequently I was informed by a most intelligent man, now resident in Belfast, but who lived for a long period at Glenavy, on the shore of L. Neagh, and spent much time in fishing, that char were abundant at the period just mentioned; he has seen five hundred taken at one draught of the net, and this not in the breeding season. A part of the lake, which was the deepest (36 fathoms) within his range of fishing, was called the whiting-hole, from being the chief haunt of this species. In 1837 I offered a handsome reward for a Lough Neagh whiting, but it was in vain that the fishermen of Glenavy endeavoured to procure one, although the once favoured haunts of the species were tried, including the whiting-hole. The fishermen at a second station tried with no better success.

"The cause of its disappearance from such a vast body of water as is contained in this lake, or at least from its old haunts there, I cannot pretend to explain; one fisherman questioned on the subject did, however, and without hesitation, account for it by saying, that 'they once went down the river Bann to the sea, and never came back again.' †

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* Incorrectly printed "Esk" in the Magazine.

† The char is stated in Black's Picturesque Tourist of Scotland, 1844 (third edition), p. 303, to have of late years disappeared from Loch Leven (Queen Mary's). The lake is there described to be from 10 to 11 miles in circum-

"From the following Irish lakes, in addition to Loughs Melvin and Eask, already mentioned, I have seen examples of char :—

"L. KINDUN, County Donegal. A specimen taken by Mr. Wm. Marshall, of Belfast, when fly-fishing here, at the end of June, 1837, was kindly submitted to my examination. In length it was 8½ inches, and agreed with the 'Northern Char.' In an accompanying note it was stated that 'its stomach contained numerous small worms.'

"L. GARTAN, County Donegal.* Hence, on July 18, 1838, I was favoured with a specimen by John Vandeleur Stewart, Esq., of Rockhill, Letterkenny. This gentleman remarked at the same time, that it was taken with the fly about five weeks previously, and that there are a great many char in the lake, which is seven miles distant from Letterkenny. It is 10 inches in length, and a fine example of the 'Northern Char;' the spots, which are numerous, are nearly all below the lateral line.

"L. DAN, County Wicklow.† From this lake several char have been kindly sent me by my friend Mr. R. Callwell, of Dublin. None are above 7½ inches *in* length; they present some of the characters both of the Northern and Welsh char, but appertain more to the former. In February, 1839, Mr. George Smith, of Baggot Street, Dublin, informed me, that in summer, four or five years since, he, when using small showy flies (with which they are often captured here), took thirteen char in this lake within half an hour; the water was very rough—they were all taken within the space of two yards, though he fished to some little distance on every side. In the summer of 1838 this gentleman saw about a dozen char lying dead and much swollen on the banks of Lough Dan. Mr. Smith has, within the last few years, seen char about 15 inches long caught in Llanberris lake, in North Wales. It will be remembered that Pennant mentions this fish as once found here, but as entirely destroyed by the mineral streams from the copper mines contiguous to the lake.

"LOUGHNABRACK, County Longford. In Dr. R. Ball's collection is a char from this locality.

"L. CORRIB, County Galway. I have been favoured with an example from this extensive lake by Mr. W. R. Wilde, who states that char are captured here in great quantity (especially about Cong) in draught-nets along with salmon throughout the season for taking this fish—from the 1st May to the 12th August. It is commonly called here *Murneene*, and by those who give an English name, 'Freshwater Herring.' These names are applied to the char in three lakes in the County Mayo, and from all of which Mr. Wilde has seen specimens. The example from L. Corrib is 13½ inches in length, and would be called the Northern Char—in a dry state, and after being preserved for some time, it is in all respects identical with my specimens from Windermere.

"A few very brief remarks may be offered in conclusion. It would appear that the differences here noticed in the char are chiefly induced by *locality*; but this in itself is rather an effect than a cause. The cause is, I conceive, based on geological influences, as the 'formation' in which the lake inhabited by this fish is situated, and whether there be a prevalence of rock, gravel, sand, or peat, —if fed by springs or a goodly river, and if the latter the formation through which it flows,—the depth of water, &c. According to these features, the quality of the water and the minute animals constituting the food of the char will vary, and the latter not only in quantity produced, but in species. According to its food the external appearance of this fish is influenced, as well as the flavour and colour of its flesh. No proper comparison, again, can in any respect be made between the char of different localities, unless the examples be in similar condition, and which, as before mentioned, they sometimes are not in adjacent

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ference. This matter is worthy of notice in connexion with the disappearance of the char from Lough Neagh.

* When visiting Lough Derg in this County, in the autumn of 1837, I was assured that char are abundant in it.

† In the lake of Luggela, in this County, the char is likewise taken.

lakes at the same period of the year. A great deal might be said on the manifold influences affecting this species, but it is for my friends, the authors of the two great works now in progress,—M. Agassiz, in his Fresh-water Fishes of Central Europe, and Sir W. Jardine, in his Scottish Salmonidæ,—to descant upon them.

"When my attention was first given to this subject, I intended to enter fully into the history of the char as a British species. This would now be superfluous, and I content myself with contributing the rough notes made upon the subject, as ere long we shall doubtless have before us, in the works just mentioned, a most ample history of the *Salmo Umbla*."

Oct., 1851.—I have been informed by Mr. Black, gamekeeper at Donard Lodge, that the char is common in Lough Owel. He has seen 60 to 70 dozen taken in a draught-net in summer. From the end of May till the end of June he has seen 2 dozen taken in a day with the natural and artificial fly, particularly the former, the "green drake" being the favourite; in these cases the fly was sunk three or four feet beneath the surface. For a few successive years not a char would be taken in the lake, and again appear to be as numerous as ever; they were in this lake at least down to 1846. They were very round in the body, and reach from 1¼ to 2 lbs; he thinks he has seen some of 3 lbs. weight.

I have since received notes of a few additional localities in Ireland where the char is said to exist, viz. Lough Shessuck, in County Donegal (W. J. Ffenell, Esq.); Loughs Kindrum and Keel in the same County (G. C. Hyndman, Esq.); Lough Erne, in County Fermanagh; a lake in County Cavan, about 2 miles westward of Drumlane (E. Getty, Esq.); Belvidere Lake in County Westmeath (Dr. Ball); Lough Bofin and several neighbouring lakes in County Galway (W. R. Wilde, Esq.).

Mr. Hyndman mentioned to me that when he was at Ram's Island, in Lough Neagh, in the year 1844, a fisherman accounted for the disappearance of this fish from the lake by saying that at a certain season they went to the "deep pools" near the three islands, where they were all taken.

A char is reported to have been caught at Bann-foot Ferry in the summer of 1844.

"In the lake of Castlebar, near that town, is the char and the Gillaroo trout."—*Daniel's Rural Sports*, vol. ii. p. 217.

THE SMELT, SPIRLING, OR SPARLING, *Osmerus Eperlanus*, Flem.,

Is recorded by Templeton, in his Catalogue, as follows:—

"*Osmerus* (Arted.) *Eperlanus*, Flem., the Smelt, is sometimes taken on our coasts in considerable abundance; but often several years intervene during which they are rarely to be met with."

This species has not occurred to me in Ireland.*

THE GRAYLING, *Thymallus vulgaris*, Cuv.

This fish, which is not now known as an Irish species, is noticed in Rutty's Dublin, but evidently in error, as it is made "a sea-fish."—Dr. P. Browne enumerates it, perhaps without any better reason; he published in 1774, Rutty in 1772. The parr has been sent to me from the South of Ireland, under the name of Grayling. Perhaps this name, as applied to the parr, may be a cor-

* [On 28th March, 1853, we procured fresh examples of the smelt, and also of the atherine or land-smelt (*Atherina presbyter*), in Belfast market, but on inquiry we ascertained that the former had been imported from England, the latter came from Portaferry. ED.]

ruption of the word *Graveling*, which is generally applied to that fish in the southern counties.

THE POLLAN, *Coregonus Pollan*, Thomp.,

Is the only species of *Coregonus* yet found in Ireland. It occurs in Loughs Neagh, Erne, and Derg, probably also in Lough Corrib.

The following notices of the pollan have already been published by me:—

"In September last (1834) a comparison of the Lough Neagh *Coregonus* with the *Vendace* of Lochmaben (whence I procured specimens through the kindness of Sir William Jardine, Bart.) proved to me that these species are distinct. The disagreement of the former with the *Gwyniad* or *Coregonus* of Wales, as described by Pennant, was at the same time very obvious; and from the examination of an individual of the latter species (lately favoured me by Mr. Yarrell), and specimens of the Lough Neagh fish, I am fully satisfied that they are specifically different.

"From the gwyniad, the pollan or Lough Neagh *Coregonus* differs,—in the snout not being produced; in the scales of the lateral line; in having fewer rays in the anal fin, and in its position being rather more distant from the tail; in the dorsal, anal, and caudal fins being of less dimensions; and in the third ray of the pectoral fin being longest, the first being of the greatest length in the Gwyniad.

"From the pollan, the vendace or Lochmaben *Coregonus* differs so essentially, in its lower jaw being the longer, as well as in its being turned upwards, as to render further comparison unnecessary.

"The pollan is very uniform in size, its ordinary length being about 10 inches; none that I have ever seen exceeded 12. The relative length of the head to that of the body is as 1 to about $3\frac{1}{2}$; the depth of the body equal to the length of the head; the jaws equal, both occasionally furnished with a few delicate teeth; the tongue with many teeth: the lateral line sloping downwards for a short way from the *operculum*, and thence passing straight to the tail; nine rows of scales from the dorsal fin to the lateral line, and the same number thence to the ventral fin; the row of scales on the back, and that of the lateral line, not reckoned; the third ray of the pectoral fin the longest.

D. 2+12; P. 16; V. 111; A. 2+11; C. 19; B. 9. *Vertebræ* 59.

"Colour to the lateral line dark blue, thence to the belly silvery; dorsal, anal, and caudal fins towards the extremity tinged with black; pectoral and ventral fins of crystalline transparency, excepting at their extremities, which are faintly dotted with black. Irides silvery, pupil black.

"As not one of the *Coregoni* of which I can find descriptions agrees with the Lough Neagh species, I am induced to consider it as new, and venture to propose for it the name of *Coregonus pollan*,* as by this trivial appellation it is invariably known in its native district."†

The above description of the pollan was read before the Zoological Society of London on the 9th of June, 1835. The following particulars I then looked forward to publish in a paper on the fishes generally that inhabit Lough Neagh, but, until this can appear, the present contribution towards the history of a species which is certainly distinct from the gwyniad and vendace (the only other,

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* Although the pollan accords not with any *Coregonus* yet described, it was with much hesitation that I bestowed on it a new name, being fully aware that the same species is often very differently described by different authors, and under the impression that it may eventually prove identical with some of the continental *Coregoni*, with which I had not an opportunity of comparing it,—the actual examination of specimens being the only true criterion by which to judge of such closely allied species as this genus presents.

† Proceedings of the Zoological Society of London for 1835, p. 77.

Coregoni known with certainty as British at the present time) may even, in this incomplete state, possess some interest.

The earliest notice of the species that I have seen is in Harris's History of the County of Down, published in the year 1744, where, as well as in the Statistical Surveys of the Counties of Armagh and Antrim, it has subsequently been introduced as one of the fishes of Lough Neagh, under the name of Pollan; but, as may be expected in works of this nature, little more than its mere existence is mentioned.*

The habits of this fish do not, with the exception of its having been in some instances taken with the artificial fly, differ in any marked respect from those of the vendace and gwyniad, and are in accordance with such species of continental Europe as are confined to inland waters, and of whose history we have been so fully informed by Bloch. The pollan approaches the shore in large shoals not only during spring and summer but when the autumn is far advanced. The usual time of fishing for it is in the afternoon, the boats returning the same evening. On the days of the 23rd, 24th, and 25th of September, 1834, which I spent in visiting the fishing stations at Lough Neagh, it was, along with the common and great lake trout (*S. Fario* and *S. ferox*), caught plentifully in sweep-nets, cast at a very short distance from the shore. About a fortnight before this time, or in the first week in September, the greatest take of the pollan ever recollected occurred at the bar-mouth, where the river Six-mile Water enters the lake. At either three or four draughts of the net 140 hundreds (123 individuals to the hundred) or 17,220 fish were taken; at one draught more were captured than the boat could with safety hold, and they had consequently to be emptied on the neighbouring pier. They altogether filled five one-horse carts, and were sold on the spot at the rate of 3*s.* 4*d.* a hundred, producing £23 6*s.* 8*d.* From 3*s.* 4*d.* to 4*s.* a hundred has been the ordinary price this season at the lake side, or directly from the fishermen; some years ago it was so low as 1*s.* 8*d.* a hundred, but at that time the regular system of carriage to a distance, as now adopted, did not exist. At the former rates they are purchased by carriers, who convey them for sale to the more populous parts of the neighbouring country, and to the towns within a limited distance of the lake. They are brought in quantities to Belfast, and when the supply is good the cry of "fresh pollan" prevails even to a greater extent than that of "fresh herring," though both fishes are in season at the same period of the year. In the month of June, 1834, 50 hundreds (6150 individuals) of pollans and 125 lbs. weight of trout were taken at one draught of a net, at another part of the lake, near Ram's Island, which was the most successful capture made there for twenty-four years. In 1834 this fish was more abundant than ever before known. Like the gwyniad and vendace, the pollan dies very soon after being taken from the water,† and likewise keeps for a very short time. It is not in general estimation for the table, but is, I think, a very good and well-flavoured fish.

Though permanently resident, the pollan is very far from being generally diffused throughout Lough Neagh, and, unlike the herring, shows but little caprice in the parts of the shore it periodically approaches, rarely appearing in places bordering its chief haunt, and which offer to our view in every respect a similar character. An example of this is afforded by a comparison of the beach between the river Mayola and Toome, where it rarely occurs, and that from the Six-mile Water to Shane's Castle, its favourite resort. A few houses contiguous to the latter locality were, so long as they existed, dignified with the name of Pollan's

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* In Harris's "Down," and Coote's "Armagh," it is supposed to be the same as the *shad*. In Dubourdieu's "Antrim," the scientific appellation of *Salmo lucaretus* is given in addition to its provincial name.

† Pennant states this of the gwyniad, and Sir William Jardine of the vendace (Edin. Journ. of Nat. and Geog. Science); Dr. Knox, however, says of the latter species, "that they live as long as most fishes on being removed from the water." —*Trans. Roy. Soc. of Edin.* vol. xii. p. 505.

Town; but within the last few years they have been pulled down to make way for "the park's extended bounds."*

In the months of November and December this fish deposits its spawn where the lake presents a hard or rocky bottom. On the 4th of December, 1835, a quantity of the largest pollans I have seen were brought to Belfast market. Several which I obtained for examination were 13 inches in length, and all on dissection proved to be females. Most of them were in full roe (the ova from $\frac{1}{16}$th to $\frac{1}{8}$th of an inch in diameter), but some had partly shed it; one of the former was in total weight $9\frac{1}{2}$ oz., the roe alone weighing $2\frac{5}{8}$ oz. In the others the proportion of roe was similar. On the 11th of the same month, several male specimens of full size that I procured, and which contained milt most prominently developed, measured but $11\frac{1}{2}$ inches. Thus showing that in maturity the female fish exceeds the male in length, in the proportion of 13 to $11\frac{1}{2}$. Its average weight when in season is about 6 oz. One specimen, mentioned to me as the largest taken within the last ten years, weighed $2\frac{1}{2}$ lbs. The only food that I have, without resorting to the microscope, detected in the stomach of the pollan was a full-grown specimen of the bivalve shell *Pisidium pulchellum*. A pebble of equal size was also found along with it. In one which I had the pleasure of sending to Mr. Yarrell, he met with a species of *Gammarus*.†—*Yarr. Brit. Fishes*, vol. ii.

The *Buddagh*, or Great Lake Trout, is occasionally taken on night lines baited with the pollan; for which purpose the perch, divested of its spinous dorsal fin, is also used. The lesser black-backed gull (*Larus fuscus*, Linn.), which frequents the lake in considerable numbers, is, in consequence of being believed to subsist on this fish, called there commonly by the name of Pollan Gull.

As yet the pollan is known to me only as inhabiting Lough Neagh. In Harris's "Down" (p. 238), it is stated, "that Lough Erne, in the County of Fermanagh, has the same sort of fish, though not in so great plenty." This is probably correct, as Lough Erne is of very considerable extent, ranking amongst the lakes of Ireland as the second in size; being inferior only to Lough Neagh.

COREGONUS CLUPEOIDES, Nilsson? Cunn.—In a letter from the Rev. T. Knox, of Toomavara, dated Jan. 29, 1838, and accompanying a specimen of a fish procured at my request, was the following observation: "We have at last been able to get the little fish mentioned by the fishermen as being found in the Shannon in winter—it was sent from Killaloe. I believe it goes down the river with the eels every winter; it takes no bait." The Rev. C. Mayne of Killaloe—by whose kind attention the specimen was secured—informs me, in reply to some queries, "that it is called a *Cunn* by the fishermen of that place, who state that it is never taken but in the eel-nets about Christmas, when the 'run of eels' is nearly over, and that they never saw more than seven or eight caught in a year, seldom indeed so many." Killaloe, it should perhaps be stated, is not less than eighty miles from the mouth of the Shannon. In the hope of ascertaining the occurrence of this fish at Portumna, about twenty miles higher up the river, I wrote to a correspondent there, at the same time describing the species, and on the 24th of March last received the following reply. "I think it very uncertain whether there is such a fish in the Shannon, but still some old fishermen say there is, and that they are a little smaller than the common herring, but exactly the same shape and colour;" and he again observes, —"after making every inquiry, I learn that about half a dozen *white fish*, like

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* Shane's Castle Park, near Antrim.

† June 10, 1836. On opening the stomachs of six pollans, I found them all filled with food, consisting chiefly of mature individuals of *Gammarus aquaticus*, and the larvæ of various aquatic insects; some shells of the genus *Pisidium*, one of the fry of the three-spined stickleback (*Gasterosteus*), and a few fragments of stone, also occurred.—*W. T.* (From Magazine Zoology and Botany, vol. i.)

herrings, were got in Lough Derg [a mere expansion of the river Shannon] very near this, about four years ago in the eel-nets, but none since, at least in this quarter." So far only is the history of the species known to me: that the *white* fish were this *Coregonus* I think hardly admits of doubt.

On examining the specimen, the nearest approximation I find to it is the *Salmo clupeoides* of Pallas,* and *Cor. clupeoides* of Nilsson,† who with a query marked Pallas's as synonymous with his species.

Although there is a tolerable general agreement, yet a want of accordance in some characters between my specimen and the description in the Zoographia renders it doubtful whether they be the same fish. Between it and Nilsson's *C. clupeoides* I perceive no specific (though a considerable individual) difference, and consider them identical, if the phrase "tereti-compresso," applied to the body in his specific characters, be taken singly, and be translated, roundly compressed; but if "tenue," ‡ applied again to the body in the detailed description, mean that it is thin or compressed, the species cannot be the same, the individual under consideration being very thick for one of the *Coregoni*.

Nilsson is altogether silent on the history of this species, stating merely that it was sent him with other fishes from Lake Wettern. As this lake communicates with the Baltic, it is to be regretted that we are not informed whether the *Coregonus* be stationary in it, or migrate to the sea, as the Shannon species is believed to do.

Desc.—General form, gracefully elongated, sloping equally from the centre of back to the head and tail, the anterior and posterior portions of the ventral profile also corresponding to each other, but rather more convex than the dorsal; rounded in the back (like *Atherina presbyter*); considerable thickness maintained throughout.§ Length $4\frac{1}{4}$ inches; depth where greatest, at origin of dorsal fin, 9 lines, or compared with the entire length as 1 to $5\frac{1}{9}$; thickness more than half the depth, just behind the head 5 lines, the same at the middle, and $\frac{1}{2}$ of an inch before the base of the caudal fin 2 lines; lateral line for $\frac{1}{4}$ of an inch from its origin sloping downwards, thence to its termination straight, and except at the tail, where it is equidistant from each, placed rather nearer the dorsal than the ventral profile; head 11 lines long, or about as 1 to $3\frac{1}{2}$ in the entire length; eye large, placed at the distance of its own diameter from the snout, and occupying $\frac{1}{4}$ the length of head; upper jaw truncated, lower roundish-oval, and when the mouth is closed projecting $\frac{1}{2}$ a line beyond the snout (in this respect exceeding that of the vendace, *Cor. Willughbei*, Jard.). The only teeth apparent with the aid of a lens are a few placed regularly on both upper and under jaws, none apparent on the tongue or the vomer; pre-opercle nearly describing the segment of a circle, opercle from the posterior base gradually narrowing upwards. *Fins;* dorsal originating half-way between extremity of lower jaw and base of caudal; pectorals pointed, nearly $\frac{3}{4}$ the length of head, these and the ventrals of about equal length; the latter commencing in a line with the first quarter of dorsal; when laid close to the body, the dorsal approaches the tail more nearly than the ventral; anal distant its own length from the first short ray of caudal; adipose ending nearly on the same line as the anal.

D. 15 (1st very short); P. 15; ‖ V. 1 + 11; A. 16 or 17; C. $20\frac{1}{2}$ ¶=Br. 7.

Scales (judging merely from their impressions, they having been rubbed off)

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* Zoographia Russo-Asiatica, iii. pp. 410, 411. To this work I have not had access, but am indebted to my friend Mr. Ogilby for transcribing from it the full description, and sending it me from London.

† Prodromus Ichthyologiæ Scandinavicæ, p. 18.

‡ The commencement of the specific characters is "C. corpore elongato, tereti-compresso;" the detailed description "Corpus elongatum, tenue."

§ It is so formed, especially the anterior half, that like the *Coregonus quadrilateralis* of the Fauna Boreali-Americana (pl. 89, fig. 1), it might be called "four-sided with the angles rounded off."

¶ This number appears in both fins, which are somewhat injured.

about 85 on the lateral line; 10 ? from it to the origin of the dorsal fin; and 12 ? from it to the ventral profile: the scales not being always precisely defined, the numbers cannot be accurately determined.

Colour (in spirits), bluish black along the back, thence olive to the lateral line, where it becomes somewhat silvery, and beneath it of a bright silver to near the base, where a gloss appears as if when recent it had been tinged with pink; belly opake white, slightly tinged with silver anteriorly, opercula bright silver, irides silvery, bounded by a blackish line above and beneath.

Although the expression of "common" be at variance with what I could learn of the history of this species, it is probably in allusion to it that Sir Wm. Jardine remarked, in a letter to me in November, 1836, that he had heard of a fish called the "fresh-water herring" being common in Lough Derg.

All the *Coregoni* hitherto recorded as British are lacustrine species, thus rendering the addition to the Fauna of the present one, which frequents the river Shannon, more than ordinarily interesting. That it migrates to the sea, as do others of the genus, both in this and the western hemisphere, is by no means improbable; but as yet, instead of proof of the fact, we have simply the conjecture of fishermen, who would not be unlikely to draw such an inference from the mere circumstance of capturing it at the same time with eels, which they know to be on their migration seawards.* —*Annals Nat. Hist.* vol. ii.

Coregonus clupeoides, Nilss. ?

By the continued kind attention of the Rev. C. Mayne (Vicar-general of Cashel) a second specimen of this fish, taken in the river Shannon near Killaloe, was forwarded to me on the 9th of November last. This individual, being quite perfect, enables me now to supply a figure of the species, and to offer some further remarks upon it. On comparing it in every character with my description of the individual first obtained ('Annals' for Dec. p. 267), which was divested of its scales, and injured in some of the fins, I find very few additional observations to be requisite. Its length is $4\frac{3}{4}$ inches, depth $10\frac{1}{2}$ lines; number of scales on lateral line, and from it to dorsal and ventral profile, as described in last, judging in that instance from their impressions merely; the scales rounded

* *Coregonus Pollan*, Thomp. A few observations on the pollan, the only other species of *Coregonus* yet detected in Ireland, will not be out of place here. When my paper on this fish was published (Mag. Zool. and Bot. vol. i.), I had seen specimens only from Lough Neagh; but from Harris's History of the County of Down it was quoted, "that Lough Erne in the County of Fermanagh has the same sort of fish, though not in so great plenty [as L. Neagh]." This I am now enabled to verify. That the pollan is not "in so great plenty" there, I became well satisfied during a visit—which was indeed a very hurried one—to the lake in the autumn of 1837, when by inquiry from many persons I could not learn anything of such a fish. But by the kind attention of Viscount Cole, who resides within a few miles of Lough Erne, I have been lately favoured with examples of the *C. Pollan* from that locality. On the 22nd of October last I received a specimen which was taken two days before, and was stated to have been the first caught this season. On the 29th of the same month, I was obligingly supplied with more examples; and in a letter dated from Florence Court the preceding day Lord Cole remarked, in reference to the species, "I have now procured in all about ten or twelve. I cannot make out that they are ever caught in any numbers in Lough Erne; indeed they are never sought after—those which I have got were taken in eel-nets in the upper lough. I have heard that three or four were caught in the lower lough this year in a drag-net. This is all I at present know about them."

Since my account of the pollan appeared, I have been favoured by Dr. Parnell with a specimen of the *Coregonus* of Loch Lomond (see his paper on this subject in the Annals of Natural History, vol. i. p. 161), and by Sir Wm. Jardine with one of the Ullswater species; both of which are distinct from the *Cor. Pollan*, this having not as yet been found in any of the lakes of Great Britain.

at the posterior margin, and smaller than in any other British *Coregonus*. D. 14; P. 16; V. 1 + 11; A. 14? C. $20\frac{3}{3}$ = Br. 9. In the dorsal, the 4th and 5th rays longest, and of about equal length; the few anterior rays of the pectorals about equal, the first much the stoutest; 4th and 5th longest in the anal, and about equal; axillary scale of ventrals rather more than one-third their length. *Colour* of specimen (from spirits), body above lateral line and a short way below it pale yellowish-olive when viewed in the shade, but with the light striking on it of a delicate silvery blue, thence to the belly silvery; dorsal and caudal fins marked over the rays and membrane with black points, imparting to them when closed a blackish tinge; pectorals, ventrals, and anal, excepting a very few black points on last, colourless.

It is desirable to institute a comparison of the chief differences between this species and *Cor. Willughbei*, the only other British fish of the genus having the lower jaw exceeding the upper in length. The *C. clupeoides* differs from this in the mouth being less obliquely cleft, or in having the lower jaw less ascending (when the mouth of *C. Willughbei* is closed, the point of the lower jaw is so elevated as to be on a line with the upper margin of the pupil of the eye; in the other it is on a line with the centre of the pupil); opercle broader and less rounded off at the base, and with the ascending margin more oblique, in *C. clupeoides*;* its scales very much smaller; outline of dorsal fin very different, the membrane in this falling considerably short of the points of the rays, and its outline from the longest ray to the extremity of the fin being somewhat rounded. This comparison was made between two specimens of *C. clupeoides*? from 4 to 5 inches in length, and two of *C. Willughbei* about 6 inches long.

From the continental species, *Cor. Marœnula*, as described by Bloch (and which, like the *C. Willughbei*, agrees with that under consideration in the lower jaw being the longer), the *C. clupeoides* differs chiefly in having a greater number of rays in the dorsal fin (14 or 15 to 10), in having teeth in the under jaw (on this difference alone I should not lay any stress, the teeth being so small as to be easily overlooked), and in the negative character of wanting such an appearance on the lateral line as would come under the description of "garnie de cinquante-huit points noirs;" the scales on the back and greater part of the sides are dotted with very minute black points visible under a lens, and of which those on the lateral line have share, but not so many as the row just above, the number of these points gradually decreasing from the back downwards.

Should this fish eventually prove to be distinct from the *C. clupeoides* of Nilsson, I would suggest that the specific name of *elegans* be applied to it.

Coregonus Pollan.

In connexion with the figure *C. Pollan* now given to accompany that of *Cor. clupeoides*, the following remarks are offered. The characters in which the pollan differed from the two British species known at the time it was announced were pointed out in the original description. From the two specimens since recorded, it may in the first place be stated to differ from *C. microcephalus*, the Loch Lomond fish, in having the head longer, the fins less (and of a lighter colour), and the scales rather smaller; from the *C. clupeoides* the pollan differs in being much larger, in the jaws being equal,† the scales rather larger and in the form of the dorsal fin.

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* The difference in this respect between these two species is not greater than we sometimes see in different sexes of the same species of *Salmo*: the *Coregoni* not having been dissected, their sexes are unknown to me.

† This seems to be the best *general* character; I have seen some individuals with the upper rather exceeding the lower jaw, others with the lower slightly projecting beyond the upper, and the difference was not sexual. It is perhaps unnecessary to observe, as it would apply to fishes generally, that other individuals examined vary much in relative proportions from those which served for the original description; the proportion of head to depth of body, it is obvious, must vary in the sexes at particular periods; that of head to entire length I

Of a female pollan, 11¾ inches in length, procured from Lough Neagh on the 28th of November last, the entire weight was 9 oz., that of the ova subsequently extracted 2 oz. 3 drachms; of this, which was just ready for exclusion, I had a drachm weighed, and reckoned the number of ova it contained; taking for granted that this would be alike in each drachm throughout the whole, (and from the uniform size of the ova, each a line in diameter, there can be very little difference,) the number of ova altogether would be 6156. This too I should consider about the average, as the specimen was of ordinary size, and contained a similar quantity of ova with several others dissected at the same time. Of the stomachs, &c. of twelve pollans examined on this occasion, the greater number were empty, but two or three contained minute *Entomostraca*, two *Pisidia*, and a *Limneus pereger*—this last was three lines in length.

Jan. 1, 1839. I received from the Rev. C. Mayne a full-grown specimen of the *Cor. Pollan*, taken near Killaloe, either on the river Shannon or its expansion, Lough Derg.—*Annals Nat. History*, vol. ii.

"Examinations of more specimens of the fish described as *Coregonus clupeoides*, Nilss. ? has proved its identity with *C. Pollan*. Different as the figures and descriptions of these *Coregoni* may appear, I have now seen individuals (so liable are they to variation) exhibiting all the intermediate characters."—*Annals Nat. History*, vol. iv. p. 70.

July 22nd, 1847.—On examining the contents of an adult pollan to-day, from Lough Neagh, I found the stomach filled with minute *Entomostraca*. The ova were the size of clover-seed, or 1-30th of an inch in diameter.

July 12th, 1851.—Yesterday and to-day hundreds of very large pollan from Lough Neagh were in Belfast market. One, a male, which has been preserved, weighed 13 ounces; and others, not fit to be preserved, weighed 15 ounces. The large ones were sold at 10*d.* per dozen; those of herring-size at 4*d.* per dozen. The contents of the stomach of one preserved and brought to me, proved to be wholly of the genus *Mysis*,* excepting a *Limneus pereger* with its animal (both perfect).

"About Lough Tron and Lough Direvragh there is found, in the month of May only, a small fish, without spot, of almost the same shape as a herring—a fish very pleasant and delightful, but not taken in great quantities; the natives call it Goaske. I know not by any name to English it."

From a Description of the County of Westmeath, written A.D. 1682, by Sir Henry Piers, Bart. See No. I. of a work entitled Collectanea de Rebus Hibernicis, printed in Dublin, 1774.

In the contents appears—

"Goaske, a species of fish peculiar to Loughs Tron and Direvragh, found in the month of May only."

"A fish peculiar to this lake (Lough Erne), about the size of a herring, and called Goaske, is taken only in May."—*Daniel's Rural Sports*, vol. ii. 208.

March, 1850. Lord Enniskillen agrees with me that the *pollan* must be meant, but he never heard the term Goaske applied to it at Lough Erne.

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have found to be as 1 to 5, as well as "1 to 3½," and the vertebræ 60. The two following characters were before unnoticed: axillary scale of ventral fins about one-third their length—about 84 scales on the lateral line: this is the number attributed by Dr. Parnell to both of the Loch Lomond *Coregoni*; in a specimen of one of these, *C. microcephalus*, under 10 inches in length (much less than the size they attain), with which I have been favoured by its describer, there are but 76? scales on this line. This induced me to examine various-sized pollans, to see whether there might be any difference in this respect, when none appeared in the individuals inspected, which were from 9½ to 13 inches in length.

* Not less than one hundred of these.

THE ARGENTINE, *Scopelus borealis*, Nilsson, *Argentina sphyræna*, Penn.

"A specimen of this extremely beautiful little fish was found in a dying state on the beach at Killiney Bay, near Dublin, by Professor Oldham, on the 11th of March, 1847. It was shown to me on the following morning in Dublin, by that gentleman, who subsequently deposited it in the Dublin University Museum.

"This specimen is $2\frac{1}{2}$ inches in total length, and so fully agrees with that described and figured by Dr. W. B. Clarke in the 2nd volume of Charlesworth's Magazine of Natural History (1838), as to render any description unnecessary. It having been dried up before being transferred to spirits, a positive enumeration of the rays in the fins is impracticable, but they are in all the fins about the number given by Dr. Clarke: the anal fin, however, extends considerably further along the body (for $4\frac{1}{2}$ lines) than represented in his figure, although it there appears as extending to twice the length that it does in Pennant's fish. It *commences* in the specimen under examination, as Dr. Clarke and Mr. Yarrell (B. F. vol. ii. p. 164, 2nd edit.) figure it, in a line with the last *gutta* of the upper row, but extends as far as the first gutta on the ventral line beyond the vacant space. The *guttæ* in all the series are—what I did not anticipate—precisely in number as in Dr. Clarke's specimen, and even where he remarks that one 'appears to have been obliterated' in the row of the smallest guttæ extending from the commencement of the anal to that of the caudal fin, it is wanting on both sides of the specimen under examination. See Dr. Clarke's paper, p. 23, and Yarrell, p. 164, for a detailed notice of these guttæ. Some writers on the argentine—as Dr. Clarke at p. 23, and Mr. Yarrell at p. 25 of the same volume, in his remarks on that gentleman's communication—seem inclined to believe that among the very few examples of this fish obtained on the British coasts, two species have been taken. The anal fin certainly is very short in Pennant's *figure*, but the author himself is silent respecting the fin and its number of rays, so that we have only the engraving on which to form a judgment. By making a fair allowance for the injury that may have occurred to the very delicate and fragile fins of this species, and for a due want of critical accuracy in the draughtsman and engraver, there is not in my opinion sufficient reason for believing that the argentines hitherto noticed as taken in the British seas were of more than one species, nor, judging from Nilsson's description of the specimen taken on the coast of Norway, do I see reason for considering it as distinct. This author refers Pennant's fish to his *Scopelus borealis*."—[Published by Mr. Thompson in *Ann. Nat. Hist.* vol. xx. p. 171.—ED.]

THE HERRING, *Clupea Harengus*, Linn.,

Is common around the coast.

Authors referred to:— Payne; Dr. J. D. Marshall; M'Skimmin.

This fish is so generally distributed, and the usual modes of capturing it have been so frequently described, that it is unnecessary to enter into details respecting the latter. Along the coasts of Down and Antrim large quantities have, of late years, been taken by means of hand-lines.—The hooks are dressed with feathers, and the time of fishing is in the evenings and about sunrise. The practice seems to have been borrowed from the Scottish Highlanders.

I received from Dr. J. L. Drummond two young herrings, taken in his presence at the quay, near the Custom House, Dublin, in July, 1834, where, for a considerable time, he remarked some boys amusing themselves by catching them in great numbers—almost as fast as they could draw them up, nearly all being taken without any bait. The lines were kept constantly moving on the water, which was muddy, and the fishes probably mistook the hooks thus in motion for living objects: nearly all of them were caught by the mouth. They differed very little in size.

The preserved specimens are similar in this respect, being 4½ inches in length.

1st specimen.—D. 18; P. 17; V. 9; A. 16; C. 20.
2nd specimen.—D. 18; P. 17; V. 9; A. 17; C. 20.

In the number of fin-rays these agree with *C. Leachii* (Yarr.), but differ in being serrated on the belly.

On comparing these two with two sprats of similar size, I find the following difference:—In the former, the D. fin originates midway between the snout and the first quarter of the longest caudal ray. In the sprats the D. fin commences midway between the snout and the last third ($\frac{2}{3}$) of the longest caudal ray. In young herrings the D. originates as far before the V. as the V. do before the D. in the sprats (*i. e.* about $\frac{1}{3}$ of the length of the V.).

In the form of the posterior margin of operculum there is a strongly marked difference, that of the sprats being somewhat rounded, whilst in the herrings the corresponding parts become broader towards the base.

I undertook the above comparison on account of these specimens being serrated on the abdomen, which Jenyns (p. 434) and Yarrell state the *C. Harengus* is not; but the differences pointed out by Mr. Jenyns between the *C. Harengus* and *C. Sprattus*, under the head of the *latter*, apply exactly to those existing between the specimens compared above. On this comparison Mr. Jenyns (p. 435) observes of the *C. Sprattus*, "Keel of the abdomen more sharply serrated than in that species (*C. Harengus*)," thus admitting that the abdomen of *C. Harengus* is serrated.

A number of small herrings, in Dr. R. Ball's possession, were also taken at the Dublin quays, below the Custom House, on unbaited hooks. The line was swept quickly through the water, and three fish brought up almost invariably, one to each hook; the hooks were black, and the fish all taken by the mouth.

In Belfast Bay the herring is generally taken from May to November; but I have notes of occasional captures in January and February.

The late Mr. Nimmo and Mr. M'Calla informed me that on the Galway coast there are two distinct seasons for the herring fisheries, viz. one in autumn, when the "Harvest Herring" is obtained, and the other in the latter end of January and in February.

In *August*, 1845, I obtained two herrings brought from Drontheim to Belfast, and could see no difference between them and herrings (examined when fresh) taken in Belfast Bay: they are 11 inches in length.

The Sprat, *Clupea Sprattus*, Bloch,

Is taken around the coast.

Localities noted:—Donegal; Tory Island (Mr. G. C. Hyndman); Belfast Bay; Newcastle (County Down); Dublin and Youghal (Dr. R. Ball); Island of Achill; Galway (Mr. M'Calla).

Authors referred to:—M'Skimmin; Templeton; Rutty and Smith (Cork).

There is no fishery for sprats on the coasts of Antrim or Down, but they are taken in great abundance in the South.

From the stomach of a large Holibut (*Hippoglossus vulgaris*) brought from Carrickfergus to Belfast market, on 10th Feb., 1837, I obtained ten full-grown sprats, the two largest 5¾ inches long. Excepting the loss of scales, they were in excellent preservation. The fin-rays of one which I examined were—D. 17; A. 18; P. 17; V. 7; C. 19. In a specimen received from Youghal they were—D. 17; A. 19; P. 16; V. 7; C. 19.

The following notes have reference to the County of Cork:

"*Jan.*, 1839.—Sprats were taken in such abundance in the S. W. of Cork about 10 years ago, that great quantities were used as manure: the tanpits, &c., were filled with them." *

"Sprats are occasionally so abundant on the South coast of Ireland, that as many as seven millions have been caught in a single haul. The fishermen at Youghal distinguish several kinds as true *Sprat*, *soft-head*, *hard-head*, &c." †

"About Christmas, 1846, vast numbers of sprats died in Cork Harbour, and were carried off in basketsful, dying and dead. The people ate them, and considered them very good; it was the year of the famine. They had mostly a 'pearl,' or white appearance, in the eye while living: some had both eyes, and others only one of them, diseased." ‡

THE PILCHARD, *Clupea Pilchardus*, Bloch,

Is taken chiefly on the more southern coasts, where a few occur every year. Great numbers are occasionally captured.

Localities noted:—Belfast Bay; Newcastle (County of Down); Youghal (Dr. R. Ball); South-West of County Cork (Professor Allman); Galway (Mr. Nimmo and Mr. M'Calla.)

In Belfast market I have seen but one pilchard, a very fine specimen, which was taken with herrings in the Bay on 26 May, 1836.

THE TWAITE SHAD,§ *Alosa Finta*, Cuv.,

Annually ascends some of the southern rivers.

Rutty mentions the "Shad" as having been found in the Liffey, near Ring's End.‖

In Tighe's Kilkenny (1802), p. 155, it is remarked that

"The Shad, *Clupea Alosa*, Linn., comes up the river (Nore?) in the end of April, and returns to the sea about the end of May, not remaining above a month in the fresh water. Though a good fish when dressed like a herring, it is not much esteemed, on account of its bones."

I do not know which species is here alluded to; but that of the neighbouring Blackwater we know, from Dr. Ball's attention to the subject, to be the *A. Finta*.

For the following note on this species I am indebted to Dr. Ball:—"Early in May they are taken abundantly in the Blackwater, at Cappoquin, where the water is brackish. They are called '*bony horsemen*,' and, not being esteemed, are sold for one penny each—even the largest, which reach 20 inches."

When visiting Donegal in 1837, I heard of the recent capture of two or three fish, such as had never been caught there before. From the description given, I had no doubt of their having been of this species.

On 29th April, 1842, I received from Dr. Hodges the head of one of these shads (judging from the presence of teeth), which was taken at Dundrum, County Down, where the species had never before been observed by the fishermen; and I have seen a drawing taken from one, caught in the river Moy, at Killala, on 26th July, 1840.

THE ALLICE SHAD,¶ *Alosa communis*, Cuv.,

Is said to be taken on the coast of Derry.

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* Dr. G. J. Allman. † Dr. R. Ball. ‡ Mr. Robert Warren, jun.
§ Yarrell.
‖ The Shad he alludes to as from Loughs Neagh and Erne is the Pollan.
¶ Yarrell.

"(*Alosa communis*, Cuv., Yarr.) Shad.—By no means uncommon. It attains a considerable size, the extreme length of the specimen examined being 2 feet 2 inches."—*Ord. Survey, Derry*, p. 15.

In Sampson's L. Derry (1802) it is remarked, p. 343 (8vo edit.), that "there is a fish called *rock-herring* of which the fishermen speak. It is taken singly, not in shoals. I suspect they mean the *alosa* or shad."

They may mean this species; but the name of rock-herring is applied by some persons to the scad, or horse mackerel (*Caranx Trachurus*), on the coast of Derry and Donegal. It is probably from some confusion about scad and shad that the latter has, in various places, had the name of *bony horseman*.

THE COMMON COD-FISH,* *Gadus Morrhua*, Linn.,
Morrhua vulgaris, Cuv.,

Is common around the coast. The principal fishmonger in Belfast considers the cod-fish to be in season from November to April. The average weight here is, he says, from 16 to 18 lbs., but he saw one weighing 50 lbs., and has been told of two taken on Holywood bank (Belfast Bay) which weighed 56 and 60 lbs. They were caught on the same day.

All the living inhabitants of the deep that it can master would seem to be sacrificed to the voracity of the cod,—fishes, crustacea, star-fishes, mollusca, worms, &c., &c.,—and I have had proof that they scruple not to consume the young of their own species.

I have ample notes of the food found in many of them; but they are such indiscriminate feeders, that it seems to me useless to enumerate the species sacrificed by them. The stomachs of some which I examined were nearly filled with *Hermit crabs*, all of which had been dragged from the shells they inhabited, as these latter were not in the stomach; in one instance a large shell of the *Fusus despectus* did occur to me in a cod.

Mr. Sinclaire has frequently, at Ballantrae, seen fine full-grown herrings taken from cod-fish: when uninjured for food, they are very wisely used by the people there for that purpose, the children especially attending the cutting up of the cod-fish, that they might get the herrings contained in them to carry off to their homes.

Rock-cod is a mere variety of the common species, inhabiting rocky localities (as the name rock-cod denotes), and of a reddish brown colour; a fact of which I have myself had evidence on different parts of the coast of the Brit. Islands. Pennant remarks, in note to p. 239, "Codlings are often taken of a yellow, orange, and even red colour, while they remain among the rocks, but on changing their place assume the colour of other cod-fish."

The rock-cod is considered good at all seasons, owing perhaps to its preying more on crustacea than the cod frequenting different feeding grounds.

I have found specimens of the common cod, agreeing so with the description of *Gadus punctatus*, Turt., as to satisfy me that this is not distinct from it.

March 3, 1840. I obtained from Belfast Bay a singularly malformed cod, similar to that figured by Yarrell, vol. ii. p. 229. Its length was 22 inches, colour as usual in the common cod. A month afterwards, I saw

* Commonly known by the name of cod: the young are called codling. A fisherman at Portaferry remarked to me that it there bore three names, viz. *codling* when young, *buddagh* when middle-sized, and *cod-fish* when adult.

another in Belfast market of the same form, but of the reddish colour of the rock-cod. These specimens are preserved in the Belfast Museum.

A beautifully-marked example of the cod, of large size, also came under my inspection here. It was of a pale lilac grey colour, closely studded over with large reddish grey spots, which were as close as I have ever seen them in any species of trout.

Pennant gives a full historical account of the cod-fish, and Yarrell treats of it amply.

THE DORSE, OR VARIABLE COD, *Gadus Callarias*, Linn.,
Morrhua — Cuv.,

Has been taken on the coasts of Antrim and Cork, as stated in the following note, which I contributed to the Annals of Nat. Hist. vol. i. p. 358 :—

"*Gadus Callarias*, Linn. Dorse.—An examination of the fishes beforementioned as taken on the coast of Cork, and forwarded for my inspection by Dr. R. Ball, enables me to restore this species with certainty to the place it once held in the British Fauna. Two small specimens thus received are in length respectively $3\frac{1}{2}$ and 6 inches ; in the latter the number of fin-rays are, D. 14, 18, 18; A. 20, 17; P. 18; V. 6; C. 24.—Br. 7. In both individuals the 1st and 2nd rays of the ventral fin are produced in slender filaments, of which the second is the longer; eyes invested with a membrane as in *G. luscus*, &c.; head to entire length as 1 to 3 in the larger, as 1 to $3\frac{1}{2}$ in the smaller specimen; no pores visible about the mouth as in *G. minutus*. In other characters these individuals agree with the *G. Callarias* as described by Bloch and Nilsson. They were taken in sprat-nets at Youghal in the autumn of 1834, when a third specimen also occurred.

"Subsequently I had the satisfaction of recognising a *G. Callarias* among some native fishes presented by Mr. Wm. Marshall (Memb. Nat. Hist. Society) to the Belfast Museum without regard to species. Upon inquiry, I learned from this gentleman that it had been captured by himself when fishing in the month of June or July, about the entrance to Larne Lough, County of Antrim, and using the lug-worm (*Lumbricus marinus*) for bait. Its length is 8 inches. We thus find that the species occurs both on the North and South shores of Ireland."—*Annals Nat. History*, vol. i.

Having given little attention to the subject since the publication of the foregoing notice of this fish, I have nothing particular to add respecting it; but as no other British naturalist seems to have noticed the species of late years, I may mention that it attracted the attention of Dr. R. Ball, who, in sending me a number of fishes from Youghal, and not having leisure himself to attend to the matter, asked what the two specimens already referred to were, distinguishing them from the other *Gadi* at first sight.

THE HADDOCK, *Gadus Æglefinus*, Linn.,
Morrhua — Cuv.,

Is common around the coast, but the numbers seem to vary much in the same localities. Dublin Bay has long been famous for its haddock, and in Belfast market this fish is estimated more highly than the cod, the price being generally 4*d*., very rarely under 3*d*., per lb. It is considered to be in season from November to April. The largest haddock of which I have any well-authenticated notes were, one taken at Groomsport, County Down, which Mr. Meenan weighed, and found to be 25 lbs.; and one taken in Dublin Bay in August, 1851, which, as stated by Dr. Ball, weighed 18 lbs.

In Belfast Bay they are occasionally found, and Mr. B. Meenan informs me that he obtained one from 18 to 20 lbs. At Killough (County Down), where the numbers taken are very great and the fish of excellent

quality, they do not appear to attain so large a size, the average weight being about 4 lbs., although individuals weighing 10 lbs. are sometimes sent thence to Belfast.

The baits most frequently used in Belfast Bay are mussels—both the horse-mussel and the edible species. It is said that the Ballantrae fishermen come to Belfast for these shell-fish.

Pennant refers to haddock of uncommon SIZE (as 14 lbs. weight) being "extremely coarse," and that the best for the table weigh from 2 to 3 lbs., but in the Irish markets, the larger the haddock the more it is generally prized. I have never met with a finer-flavoured fish than one of 10 lbs. of which I partook.

The food of this fish varies according to locality. Many examples purchased by Dr. J. L. Drummond and by myself in Belfast market during one season, contained only the remains of *Ophiuræ*, and were almost invariably filled with the most spinous species of this genus, *Oph. rosula*. In his valuable papers on the Irish Entozoa, published in the Mag. Nat. Hist., Dr. Drummond attributed the absence of intestinal worms in the haddocks which he had examined, to the circumstance of the stomach and intestines of the fish containing the spines of *Oph. rosula*. Almost every haddock that I have opened had the stomach and intestines filled with the remains of *Ophiuræ*,* &c. &c. The cod-fish, although often exhibiting an extraordinary variety of food, I sometimes find quite empty; and we rarely see any food in the salmon.

In the month of February my attention was once called in Belfast market to a large haddock in fine condition, which was singularly coloured. It was clouded over the sides with an extremely pale stone colour, apparently as if the skin had been taken off, but this was the natural colour, and all the scales were on.†

Oct. 14*th*, 1848.—One of these fishes, 18 inches in length, and in good condition, was brought to me from Belfast market on account of its colour. Where usually grey or dark-coloured, *i. e.* over the upper half of the body and head, it was of a beautiful rich salmon colour, of which also all the fins partook, except the caudal one at its extremity, which was dusky; more than its basal half was salmon-coloured, the V. and A. fins were lighter than the D. The whole of the lower portion of the sides and belly, usually white, were very faintly blushed over with light salmon colour. The blackish marks near the pectoral fins were extremely faint. Not a greyish or dusky hue was seen anywhere on the fish except at the tip of the caudal fin, and at the nearly obliterated blackish spots below P. fin.

A specimen taken off the entrance to Strangford Lough and brought to Belfast market, on 21st March, 1850, was of the following singular colour.

The upper surface of the head and the back were of a pale golden yellow, of which the dorsal, caudal, and pectoral fins partook, the D. and C.

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* [The MS. contains full notes of the various kinds of food which Mr. Thompson found in 119 haddocks, examined by himself during a period of 16 years. The results may be thus briefly stated:—In 102 of these fishes were fragments of *Ophiura rosula*, which in many instances completely filled the stomach. Other species of the *Ophiuridæ*, small crustacea, shells, a few sea-mice (*Aphrodita aculeata*), and *Nereidæ*, sea-urchins, one *Actinia*, two small fishes, viz. a *Cottus* (species not mentioned) and a young herring, constituted the remainder of the food. ED.]

† "On one occasion a large haddock was obtained of a canary colour; on another, a small fish of a light rose red, by Dr. Ball, in Dublin."

fins having besides the usual blackish margining. The golden colour does not reach so low as the lateral line, which line is *white* as well as all the body beneath it, the usual blackish mark on each side being consequently wanting.

It was a deep, finely-made fish, length 27 inches, depth of body measured in a straight line 6¼ inches.

THE BIB, POUT, and WHITING POUT,* *Gadus luscus*, Linn., *Morrhua lusca*, Cuv.,

Is of occasional occurrence on all quarters of the Irish coast.

I have seen specimens at every season of the year in Belfast market, but rarely more than one at a time; they are brought from the Antrim and Down coasts.

March 10th, 1835.—I purchased the specimen in Belfast market of which the following are particulars:

Length 15 inches.

D. 13, 23, 17; P. 17; V. 6; A. 33—21; C. 28; B. 7.

The 1st and 2nd rays of V. fin "produced and Setaceous." Flem. and Don. say 1, Pennant 2.

Depth of body 4¼ inches.

Teeth in both jaws and on vomer.

Bubble-like membrane blown over each eye.

Process from under jaw 1 inch long.

Colour of body uniform grey glossed with gold and silver, more especially about the head; belly dirty white.

D. and C. fins pale grey edged with a darker grey, the latter terminated by a narrow black band.

P. pale grey with a conspicuous black spot on the centre of one and at the base of both. A. fins of a darker brown than the others, and uniform in colour; a white stripe on the body of the fish at base of first anal fin.

Irides silver clouded with blackish brown.

On dissection I found this specimen to be a female, the roe being very large. It was taken at Killough. Called *Hen-fish* in the market.

Feb. 27th, 1837.—I bought a *Gadus luscus* in Belfast market, brought from Killough. It was 13½ inches long, and a female containing pea—each ovum being at least ⅓ less than ordinary-sized clover seed. The stomach was filled with the remains of small crabs (*Brachyuri*), and contained a specimen of *Trochus tumidus*. Another specimen which I examined contained the remains of fish.

THE POOR OR POWER COD, *Gadus minutus*, Linn., *Morrhua minuta*, Cuv.,

Has been obtained on the North-East, the South, and the West coasts.

The following note was contributed by me to the Annals Nat. Hist. vol. i.

"*Gadus minutus*, Linn. Poor.—Among some fishes taken in a trawl-net by Mr. Hyndman in Belfast Bay in the month of September, 1835, and kindly preserved for me, are three individuals of this species, which as British has hitherto been known only to the southern coast of England. These specimens are under 4 inches in length; their fin-rays about the number described by Mr. Jenyns, but it may be observed that in the 1st and 2nd D. fins the second ray is longest;

* Called *Hen-fish* in Belfast market, and (according to Mr. M'Calla) *Crow-fish* in Galway Bay.

in the 3rd D. fin, the third, fourth, and fifth rays are longest, and of about equal length; in the 1st A. fin the rays gradually increase in length posteriorly to the seventh, which, with the eighth and ninth, are of about equal length. Tail slightly forked, just as represented in both editions of Pennant's British Zoology.

"Feb. 19th, 1836. In Belfast market I obtained a *G. minutus* which was taken along with a quantity of atherines (*A. Presbyter*) in Strangford Lough. Its length is 6 inches; the exact number of fin-rays are, D. 13, 24, 20; A. 27, 22; P. 14; V. 6; C. 20 (with many side rays).

"Lateral line curved anteriorly for very nearly half its length, remainder straight. Colour just as described by Bloch; above the lateral line pale yellowish brown, marked with extremely minute black dots, below it silvery minutely dotted with black, which latter marking prevails in the pectoral and anal fins; irides silvery, tinged with black above.

"In the same jar with the last-mentioned *Gadus Callarias* were three specimens of *G. minutus*, which I learned from Mr. Marshall were taken at the same time and place with it, and with the same bait. The largest is $8\frac{3}{4}$ inches long, diameter of its eye $8\frac{1}{2}$ lines. Jan. 12th, 1838, I received a *G. minutus* 8 inches in length from Killough, on the coast of Down. Among fishes from Youghal, submitted to my examination by Dr. R. Ball, in July, 1837, were two individuals of this species, one $8\frac{3}{4}$ the other $10\frac{1}{2}$ inches in length.

"The figures of *G. Callarias* and *G. minutus* in Mr. Yarrell's British Fishes are very characteristic; the curve of the lateral line, however, approaches the tail more nearly in my specimens of the latter than is represented in the figure —in all of them about one half of this line is curved."

This species is permanently resident on the shores of Ireland, evinced by my obtaining them at all seasons of the year.

On the coast of Down and Antrim they are chiefly taken in our sheltered bays, where I have no doubt they breed.

The fishermen distinguish them from all the other *Gadi*, by their gold-coloured backs, the silvery aspect of the lower portion of their sides, and the deciduousness of their scales. The largest example which I have seen (with the exception of that already mentioned as measuring $10\frac{1}{2}$ inches) was taken at Killough, County Down; it was 10 inches long and $2\frac{1}{2}$ inches deep.

In the stomachs of those examined crustacea chiefly are found; in one was a full-grown *Pagurus Bernhardus*, which must have been dragged from its shell and eaten.

Fragments of the marine plants *Zostera marina* and *Asperococcus fistulosus* have also occurred.

The observation of Mr. Couch, as quoted by Mr. Yarrell (p. 242, vol. ii. 2nd ed.), that this fish frequents the edges of rocks, although doubtless correct, induces me to remark, that most of the examples which have come under my observation were taken on a soft oozy bottom, and some of these in the middle and deepest portion of Belfast Bay.

THE WHITING, *Merlangus vulgaris*, CUV.,

Is taken commonly around the coast. In the North it is not held in much estimation, and it is consequently sold at a low rate. At Killough (County Down), where this species is abundant, examples weighing 5 lbs. are said to be occasionally taken.*

The whiting is considered best in spring.

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* Mr. B. Meenan.

The Pollack, Whiting Pollack, or Lythe, *Merlangus Pollachius*, Cuv.,

Is a common species around the coast.

The largest example seen by myself was brought to Belfast market in Nov. 1836. It was 2 feet 9 inches in length, and weighed about 12 lbs. In its mouth was a large specimen of *Sertularia falcata*. I have heard of individuals weighing 20 lbs. being captured in Larne Lough, where the species is very abundant.

As an article of food the pollack is considered superior to the coal-fish; but both of these fishes are sold at a very low price.

Mr. M'Calla informed me that on the Galway coast small fresh-water eels, ingeniously fastened on the hooks, are use as bait for the pollack.

The Coal-Fish, *Merlangus Carbonarius*, Cuv.,

Is one of the most common fishes around the coast.

Its provincial names are more numerous than those of any other of our native species. At Portaferry (Co. Down) it passes under four names: the fry are called *Gilpins;* next size *Blockan;* then *Greylord;* and to very large fish the term *Glashan* is applied.* In some parts of the South and West it is called *Black Pollack* and *Glassin*.

In the season I have seen this fish angled for by boys from the quays wherever I have been around the coast, and generally taken in abundance. It is rarely eaten but by the poorer people.

The late Mr. Nimmo, jun., of Roundstone, informed me that in 4 or 5 hours he has caught 1000 of these fish there, from ½ lb. to 1 lb. in weight, of which size he considered them better for the table (being firmer) than larger fish.

M'Calla states that the terms used at Roundstone, of *Glossan* and *Moulroush*, apply to the coal-fish in different stages of growth, and that coal-fish is applied to the full-grown fish.

In Belfast Bay a few *large* examples of this fish are not unfrequently taken in mullet nets, in the spring of the year. I have seen them of 25 and 30 lbs. so taken. The largest specimen taken in Belfast Bay, of which I ascertained the weight, was 32 lbs.; this fish was 2 feet 9 inches in length. Two others, captured in the month of December, of which I took measurements, must have considerably exceeded that weight, as they were each 3 feet in length and a foot in depth, not reckoning the curve of the body; they were in high condition, well-shaped, and firm. I have noted a few other examples here 3 feet in length; these last were taken in mid-winter.

The food which I have most frequently found in the stomachs of coal-fish was small crustacea, as *Idotea*, &c.; and Dr. J. L. Drummond, who opened many of them during his researches on Entozoa, almost invariably found the stomachs filled with *Onisci*. I have occasionally observed fishes in them, and once, on opening a couple, I found a *Patella cærulea* in each. They are said to swim in shoals when in pursuit of herrings, and to be very destructive to these fishes.

At Newcastle, Down, I have seen them brought in from the deep sea, all caught with the lug-worm.

Pennant's observation, that the colour of this species deepens with age,

* [The young are also called *Cudden* and *Pickey* in some localities.—Ed.]

is perhaps correct, as of general application; but I have remarked numerous individuals from 1 to 2 feet in length, taken in company, to be all of the same dark greenish-black hue.

Dr. Drummond describes as a beautiful sight a play of these fish, as once witnessed by him near Larne. The whole sea about the boat was alive with them playing about in all attitudes, with a rich evening's sun illuminating their sides. They never minded the boat going among them, being intent only on their gambols, and were drawn into it in numbers with an instrument like a boat-hook.

Merlangus from Ballywalter, May, 1836.

A specimen, about 7 inches in length, seems intermediate between *M. Pollachius* and *M. Carbonarius*, both of which I obtained at same time and place, and of similar size to this.

In the form of the lateral line it is intermediate, taking the form of the D. profile, instead of the curve of *M. Pollachius*, and the straight line of *M. Carbonarius*.

Jaws equal, but snout projecting a very little beyond lower jaw.

Tail more forked than in *M. Pollachius*.

D. 15, 20, 21; A. 25, 20; P. 20; V. 6; C. 36, and many short; B. 8.

Colour much the same as in *M. Carbonarius:* lateral line whitish.

The Green Cod, *Merlangus virens*, Cuv.

I have often looked for this fish, and have obtained examples agreeing with the brief descriptions of British authors, but they were nothing more than *M. Carbonarius*.

It seems to me that positive characters are wanting by which to distinguish the *M. virens* of *British Authors* from *M. Carbonarius*. I speak from an examination of numerous examples of fishes in a recent state, some of which agreed as well with *M. virens* (as described) as with *M. Carbonarius*.

In the Annals Nat. Hist. vol. vi. p. 404, Mr. M'Coy, in reference to this fish, says:—

"*Merlangus virens*.—Rare in Dublin Bay."

The Hake, *Merlucius vulgaris*, Cuv.,

Prevails around the island, but is most common on the southern coast.

Mr. Yarrell says the hake

"is so abundant in the Bay of Galway, that, according to a recent writer, this Bay is named in some ancient maps, the *Bay of Hakes*. On that part of the Nymph Bank, off the coast of Waterford, this fish is also so plentiful, that 1000 have been taken by six men with lines in one night." *

The late Mr. Nimmo (Roundstone) informed me that this fish is caught upon the Galway coast. Commonly in November four or five men in one boat will take, with hand-lines, from 600 to 700. Sometimes, but very rarely, 1000 are captured, but only when herrings are in the Bay: it feeds on them.

Professor Allman states that hake is chiefly caught on the S. W. coast of Cork with a slice cut out of one of its own species.

It is so little esteemed in Belfast market that it is not often exposed here for sale; but I have seen examples occasionally in winter, measuring about 3 feet 9 inches in length. I have also observed adult fish taken on

* Br. Fishes, vol. ii. p. 259. The information contained in this extract seems to have been obtained from Griffith's edition of Cuvier and from Pennant.

the Down and Antrim coasts in June and July. In October, 1851, a large hake which had been left in shallow water by the receding tide, near the town of Belfast, was captured and thrown upon the deck of a lighter. When it was apparently dead a by-stander incautiously took hold of it, when the fish "seized his thumb with such earnestness, that, in order to release himself, he was obliged to bring away three of its formidable teeth, deeply imbedded in his flesh."

In Donegal Bay the hake fishery begins in September.

The few examples of hake critically examined by me at different times had all the posterior portion of the anal and dorsal fins produced so as to form a rounded lobe. (See Yarr. Br. Fish. ii. 261.)

THE LING, *Lota Molva*, Cuv.,

Is found around the coast.

In the North they are generally taken with conger-eels, the two species being sought for together. The largest native specimens of which I have a record weighed 59 lbs, and was captured near Carrickfergus.

In Belfast market I have seen examples 4 feet long. Mr. Wm. Darragh caught one which measured 5 feet in length in Belfast Bay, not far from the town, and he describes it as having evinced great ferocity when brought into the boat. The bait used was the flesh of a flounder. On one occasion I found a dab (*Platessa Limanda*) in the mouth of a ling in Belfast market.

"At Roundstone (County Galway) this fish is taken in quantity, 15 to 20 dozen being caught in a day on a long line. Fishermen whose chief object is ling-fishing generally remain out from home for a week, but come in every night to a harbour in Boffin Islands. One boat with six men, if plenty of herrings are to be had for bait, will take each man with a spilliard 60 or 70 dozen of cod, ling, and haddock in one day." *

The ling is a prettily-coloured species in a young state. A description of a small example may be worth a place here, especially as Mr. Yarrell had not a specimen of the ling to describe from.

A specimen obtained in Belfast market, *January 12th*, 1838, was as follows:—

Total length 11½ inches.

D. 14—65; A. 60; P. 19; C. about 40; V. 6. Upper jaw the longer. Teeth numerous, small and rasp-like in upper jaw, a single row of much larger teeth in lower jaw, in which they are few in number, the largest teeth on palatine bone, throughout which a row extends. Barbule on lower jaw 8 lines long or nearly ⅓rd the length of head. Posterior part of 2nd D. rather the most elevated part. A. pretty equal in height throughout. Lateral line for ⅓rd from above operculum extending in a straight line down to centre of body, thence to C. fin straight. Jenyns says merely straight, which is not strictly correct. Colour of back and sides yellowish olive, handsomely broken and divided throughout into patterns by lines of pale lilac.

The 1st D. similarly coloured with a narrow margin of white, just within which, at its *transverse* termination, is a very conspicuous large black spot.

The 2nd D. fin similarly coloured to near the margin, within which a line of pale yellowish brown extends, the margin itself exhibiting a narrow line of white; just within the white margin, rising at a right angle

* Mr. Nimmo.

from the body, is a conspicuous black spot, and from this a narrow line of black runs for some distance forward between the white and brown marginal lines just mentioned.

A. fin transparently colourless with a very narrow white margin, and black as in the D. within the white line which terminates it transversely, and the black runs forward for some way near the margin.

C. fin coloured like the body till towards the margin, where a broad band of rich brown and black intermixed appears, and is margined with white.

P. fins dull yellow.

V. fins white. Under parts white with a delicate lilac hue.

THE THREE-BEARDED ROCKLING, *Motella tricirrata*, Nilss.,
— *vulgaris*, Cuv.,

Is found sparingly around the coast.

Its colour is very variable. Mr. Yarrell remarks that "young fish of this species are of a uniform brown colour until they have acquired 6 or 7 inches in length," but the first specimen of it which I captured (in Jan.) was only $3\frac{3}{4}$ inches long, and of a brown colour, thickly spotted over the head, opercula, back, and sides with pale yellow spots: it was taken in Strangford Lough.

A 2nd example 9 inches in length, and captured in Belfast Bay, was similarly marked. Small examples under 3 inches in length taken at Lahinch, Co. Clare at the end of July, under stones between tide-marks, were, together with examples of the five-bearded species taken at the same time, uniform in colour.

Of two specimens of 10 and 14 inches long which I received from the rocky coasts of Down and Antrim, the smaller was marked with a few black pea-sized spots more numerous posteriorly, and the other displayed numerous black markings just as represented in Donovan's Fishes, plate 2: the ground colour of both fishes rich brown. The pupil of the eye was dark blue, irides silvery clouded with brown; the stomach contained a small crab (*Platycarcinus Pagurus*) and the remains of a fish. In Dr. R. Ball's collection is a specimen from Youghal 20 inches in length, 2nd D. 56; A. 51; P. 21; V. 8; C. 34 in all.

Two males which I received from Donaghadee early in the month of Oct. had the milt highly developed. This species is said to be "very common in Roundstone Bay, Connemara." *

THE FIVE-BEARDED ROCKLING, *Motella Mustela*, Nilss.,
— *quinquecirrata*, Cuv.,

Is distributed around the coast, and is more common than the three-bearded species. I have obtained specimens taken in rock-pools from numerous localities, and also one example dredged by Mr. G. C. Hyndman in water from 3 to 6 fathoms deep in Belfast Bay. Some young ones which I obtained at Lahinch in the month of June were less than 2 inches in length.

THE TORSK OR TUSK, *Brosmus vulgaris*, Cuv.,

Is said to have been taken on the coast.

We can only quote on this species, as Irish, the five words used in

* Mr. M'Coy, in Ann. Nat. Hist. vol. vi. p. 404.

M'Skimmin's History of Carrickfergus, viz. "*Gad. brosme*, Torsk, very rare."

This is a northern fish: in Great Britain it is sometimes taken in the Forth becoming more common northwards. About the Orkney Islands it is common, and at the Shetlands abundant.

THE GREAT FORKED BEARD, *Phycis furcatus*, Cuv.,

Has, in a very few instances, been taken on the North-East coast.

In the Annals Nat. Hist. vol. ii. p. 14, I published the following note:—

"*Physis furcatus*, Flem., Common Fork-beard. — To Cortland G. M. Skinner, Esq., of Glynn Park, Carrickfergus, I am indebted for a remarkably fine specimen of this fish, which was kindly secured for me on its being stated by the fishermen who captured it to be a species quite unknown to them. It was taken on February 24, 1836 (a calm day), with a gaff or hook, as it 'lay floundering' on the surface of the water; was very violent when brought on board, and before dying had struggled so hard as to divest itself of nearly all its scales.*

"The discrepancies of authors relative to the *Phycis furcatus* induce me to add the following description of this individual: length 25 inches; greatest depth of body 6½ inches; weight 6½ lbs. With Cuvier's short description (Règ. An. t. ii. p. 335), and which is adopted in the Manual of British Vertebrate Animals, it agrees in only one of the three specific characters, that of the first dorsal being more elevated than the second. Its 3rd D. ray is longest,† being 3 inches in length, and terminating in a filament; the 2nd ray is 2 inches, and the first but 10 lines long. Upper jaw much the longer; ventral fin, from base to extremity of the longer fork, 7¾ inches; to that of the shorter 5½ inches. Head 5 inches 10 lines long, nearly as one to four in length of body; P. fin rather more than half the length of the head, and central between the dorsal and ventral outline; profile rather angular from D. fin to eye, above which it is a little depressed; eye exceeding an inch in diameter; nostrils double, 3 lines apart; beard very slight, 1 inch 2 lines long; 2nd D. and A. fins increase gradually in breadth posteriorly, at their termination cut square, or at right angles to the body; no spines before the A. fin, as in those described by Mr. Couch (Linn. Trans., vol. xiv. p. 75); tail obscurely rounded; lateral line much incurvated for two-thirds its length anteriorly; vent 10⅛ inches from snout; 'jaws and front of the vomer armed with several rows of sharp card- or rasp-like teeth."

"D. 9—64; A. 54; P. 17 (6th longest); V. 1; C. 24, reckoning all; Br. 7.

"*Colour* of body lilac grey, becoming paler towards the belly; D. A. and C. fins lilac grey, terminated with black; P. fin dark grey; V. fin greyish, towards extremity white; interior of gill-covers rich purple; eyes silvery round the pupil, thence to circumference brown.

"On dissection it proved a male, the milt weighing 11¼ oz. The stomach contained some crustacea and two small whitings (*Merlangus vulgaris*).

"Since the above was written, I have learned that a specimen taken about the same place occurred to the late Mr. Templeton (Mag. Nat. Hist., vol. i. p. 411, New Series). The species should consequently have been omitted as an unrecorded Irish one; but as a description was drawn up, and specimens had not come under the inspection of either Yarrell ‡ or Jenyns previous to the publication of their respective works, it has been considered better with this notice to retain it."—*Ann. Nat. Hist.* vol. ii.

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* Specimens are in the Ordnance Collection.—*R. B.*

† The error of Pennant and Cuvier in considering the 1st D. ray the longest may perhaps be attributed to a want of due examination, as otherwise it does so appear, and more especially in a dried specimen.

‡ The first edition of Mr. Yarrell's Br. Fishes was here referred to.

Subsequently to the publication of the foregoing particulars, I saw t
examples of this fish from the same locality (Carrickfergus). One
these, about 15 inches in length, was taken in March, 1839, when swi
ming on the surface of the water. The other was procured in Dec., 18
and was 26 inches in length.

On 28th Jan., 1849, a male, 22 inches long, taken at Portaferry (Coun
Down), was presented in a recent state to the Belfast Museum by Geor
Johnston, Esq. — This fish had "the first dorsal fin triangular, mu
higher than the second; the anterior rays produced."—The ventral ra
7 inches long; head, $4\frac{1}{4}$ inches long.

THE LESSER FORKED BEARD, OR TADPOLE-FISH, *Raniceps trifurcat*
Flem.,

Has been taken on one occasion, as noticed by me in the Ann. Nat. Hi
vol. ii., from which I extract the following:—

"*Raniceps trifurcatus*, Flem., Tadpole-fish.—To Capt. Fayrer, R. N., I a
indebted for a specimen of this fish, picked up on the 21st September, 1837,
it lay floating upon the sea off Donaghadee harbour—it was received in a rec
state. Its agreement with Dr. Johnston's description (Yarrell's Brit. Fish., v
ii. p. 206) * is so complete, that any except the few following notes on the
dividual seem to be unnecessary.

"Its length is $10\frac{1}{2}$ inches; in number the fin-rays are,

"D. 3—63; A. (somewhat injured) 57 ? P. 23; V. 6; C. 36.

"Second ray of the first dorsal fin thrice the length of the other rays; seco
ray of the ventral fins considerably the longest; no tubercles on sides sensi
either to sight or touch; no lateral line apparent; body all over 'smooth a
even;' cirrus $4\frac{1}{2}$ lines long.

"In *colour* it is entirely of a lilac brown except the belly, which is dirty wh
very faintly tinged with lilac; folding of the lips china-white; fins all of
uniform lilac black, except the ventrals, of which a portion is paler than
rest; inside of mouth pure white; irides of a yellowish-brown colour."

At a meeting of the Dublin Nat. History Society in Jan., 1852,
Andrews, Esq. noted its occurrence in Dingle Bay (County Kerry), h
ing been caught on a long line set for cod-fish.

I have been favoured by the late H. D. S. Goodsir, Esq., with spe
mens (of which he at different times obtained several) which were tak
in crab pots at the mouth of the Firth of Forth.

THE MACKEREL-MIDGE, *Motella glauca*, Jenyns.

"*Motella glauca*, Jenyns, Mackerel-midge.—Two minute specimens—
larger $1\frac{3}{4}$ inch long—of *Motella* that I have closely examined, and which w
obtained at the South islands of Arran (off County Clare), by R. Ball, Esq.,
June, 1835, agree in every respect with the *Ciliata glauca* of Couch, describ
in the Magazine of Natural History, vol. v. p. 16; at the same time I cann
perceive any specific difference between them and *M. Mustela*." — *Ann. N
Hist.* vol. ii.

"*Mackerel Midge* is by no means rare at Kilmore (County Wexford)
Major Walker, Feb. 26th, 1847.

Motella glauca, Sept. 16th, 1848. One was dredged in winter from 4-
6 fathoms in Belfast Bay.

"A specimen of this minute fish was on the 22nd June, 1844, taken in co

* First edition.

pany with a few others of allied species at the Kyles of Bute by Mr. Hyndman: they were at the surface of the water."—*Ann. Nat. Hist.* vol. xviii. p. 315 (1846).

The following observations on this species were published by me some years ago in Annals of Nat. History, vol. ii.

Description of a minute Fish allied to the Ciliata glauca, *Couch, and* Gadus argenteolus, *Mont.* Plate XVI. figs. 1, 2, 3.

When dredging in Strangford Lough, County Down, on the 2nd of July last, at from one to three quarters of a mile off the shore, and the water from ten to twenty fathoms in depth, I for upwards of an hour remarked some very minute fishes coming singly to the surface. They ascended in a somewhat vertical direction, remained but momentarily there, and again, generally in a similar manner, descended until lost to view. Their back appeared to be of a dark colour, but their sides presented the brilliancy of the brightest silver. Their size was rather under an inch; their motion, though somewhat wriggling, surprisingly rapid; so much so, that although the boat was scarcely moving, and the sea quite calm, their continuance at the surface was so short, that the greatest activity had to be exerted to secure them. For this purpose a small canvass net, otherwise used in the capture of minute *Medusæ*, was available. When brought into the boat, they at first sight called to mind the *Ciliata glauca* and *Gadus argenteolus;* but the great size of the ventral fins, which were likewise of a pitchy blackness for nearly the last third of their length, seemed opposed to their identity with these species. The boatmen who accompanied me had not observed this fish before, nor had they heard anything of it.

Desc.—General form elongate; belly protuberant. On a close examination of all the specimens, nine in number, no cirri can, with a high power of lens, or on the field of the microscope, be detected on either jaw. The largest individual, 10½ lines in length, may be characterized as having the upper jaw the longer; strong and pointed teeth in both jaws; head occupying rather more than ¼ of the entire length; eye equal in diameter to ⅓rd the length of the head; opercle rounded at the base, altogether forming a portion of a circle; first dorsal fin originating just over the opercle, so sunken, and its rays (which are thick and blunt) so short, as to be hardly distinguishable in the profile of the fish, not less than 25 rays; second dorsal commencing close to the first, and before the end of the pectorals, of unequal height, extending to the base of the caudal, not less than 50 rays; pectoral fins rather less than ⅕th of the entire length, of moderate size and rounded, placed very high, somewhat above the opercle, about 20 rays; ventrals placed high, commencing rather in advance of the pectorals, somewhat square at the end, occupying ¼ of the entire length, reaching to the vent, and consisting of about 6 rays; anal fin commencing at the vent, and extending to the base of the caudal, unequal in height, having at least 40 rays: caudal fin elongate, occupying ⅕th of the entire length (measured from last vertebra of body), somewhat rounded at the end, containing about 30 rays;* branchial rays about 7; vent midway between snout and base of caudal fin. Colour when recent —back rich green varied with dots of gold and black; operculum, entire sides and under-surface bright silver; pectoral, dorsal, anal, and caudal fins uniformly of a pale colour; ventrals likewise so for ⅔rds from the base, remainder pitch black; irides silvery.

Since the above was written, I have been favoured by Mr. Yarrell with original specimens of *Ciliata glauca*, obtained from Mr. Couch, and from these the Strangford species differs as follows. My specimens, under 11 lines in length, do not, like the Cornwall fish—which is 1 inch 5 lines long—exhibit cirri on either jaw. The ventral fins in mine are equal to ¼th of the entire length, in the English specimen to about ⅓th; in the latter the longest rays have a fibrous termination (to

* Although the number of rays in the fins cannot be given with certainty, an approximation to it has been thought better than entire silence on the subject.

the extreme of which the length of the fin was estimated), whereas these fins are somewhat square at the end in the Strangford specimens; besides, they are in these of a pitchy blackness for the last third of their length, although in the otherof a uniform pale colour throughout. These differences were likewise constant in Cornwall and Strangford specimens of similar length.

On placing the authentic *Ciliata glauca* and a *Motella quinquecirrata* * of equal size together, the difference is very great; the dull hue of the latter presenting quite a contrast to the colour of the other, which is of as brilliant a silver as any of the *Clupeiadæ*. Its general organization, too, is much more delicate than that of the *Motella*: in the form of the head they are different; in *C. glauca*, the separating line between the opercle and pre-opercle, both of which are silvery and somewhat hard, is conspicuously marked; in the *Motella* the opercle appears *exteriorly* undivided, in consequence of its soft and fleshy covering. The snout of *C. glauca* is shorter than that of the other, and the mouth smaller; this is differently formed from that either of a *Motella* or *Clupea*, but possesses numerous sharp and curved teeth along both jaws. Its rictus is in a line with the first third of the eye; that of the *M. quinquecirrata* with its posterior margin. No pores are apparent within the posterior line of the opercle, as in the species just named, but a row of them surmounting the upper lip. The difference in the ventral profile is considerable, all the specimens of *C. glauca* being, from the protuberance of the belly, very convex anteriorly,—an appearance which the *Motella* does not present.

When announcing this species in the Magazine of Natural History (vol. v. p. 15), Mr. Couch founded a new genus upon it, which he called *Ciliata*; but, subsequently, in the works of Mr. Jenyns and Mr. Yarrell, it appeared as a *Motella*. Although its possessing the very few characters assigned to this genus may be considered sufficient to place this fish under it, the comparison of specimens, of which the result has been given, induces me to think that it should constitute a new genus. It participates in the characters both of *Clupea* and *Motella*, resembling the former in its silvery brilliancy,† and in almost instantly dying on removal from the water (which the latter genus can long survive): its *form*, posterior to the head, is precisely that of *Motella*, with which it likewise accords in possessing cirri. In selecting a generic name, that of *Ciliata* should, by reason of its priority, be adopted, were it not pre-engaged.‡ Such being the case, I propose, as a compliment well merited by Mr. Couch for his practical knowledge of fishes, that the genus be named after him, *Couchia*. To the Strangford species the name of *minor* may be given.

Generic characters.—Couchia. Body elongate, compressed posteriorly; first dorsal fin, like that of *Motella*, very low, composed of soft rays unconnected by a membrane; pectorals and ventrals placed high; second dorsal and anal fin long; divisions of opercle well defined exteriorly.

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* One of the two individuals which, judging from their agreement with the characters assigned to *C. glauca*, were noticed as such in the Annals for September last (p. 14), at which time I had not seen authentic specimens. In colour there certainly was a want of uniformity with the description; but it was considered that this might have been changed by the preserving liquor. Compared with the figures of Couch and Yarrell (chiefly owing to their being uncoloured), no obvious difference appeared. By the accompanying coloured figures, though taken from specimens long preserved in spirits, I have endeavoured to show this difference; in such small representations it is almost impossible to give more than the general aspect of the fish.

† It has a metallic appearance, as if covered with silver-leaf, wholly unlike the silvery whiteness of the lower portion of the body in some of the *Gadidæ*, as *Gad. minutus*, *Merlangus vulgaris*, &c.

‡ *Ciliés*, which may, I think, be considered equivalent to *Ciliata*, though I know not whether this term itself has been used, appears, from Jourdan's Dict. des Termes, &c., to have been adopted in a somewhat similar sense by four different authors.

Specific characters.—Couchia minor. Lesser Mackerel-Midge. Upper jaw the longer: ventrals long (from $\frac{1}{4}$ to $\frac{1}{3}$th the length of head), and black at their termination; sides silvery.*

The *Gadus argenteolus* of Montagu, Wern. Mem. vol. ii. p. 449, must be adverted to in connexion with the present species. By its describer it is stated to be "nearly allied to the three-bearded cod, *Gadus Mustela*, in most particulars; but the shape of the head and the colour† are essentially different." It was the striking dissimilarity presented by a comparison of specimens of *C. glauca* and *Mot. quinquecirrata* in these very characters, that led me to re-separate them generically; and consequently the *C. glauca* and *G. argenteolus* may, from agreement in these points, be in the first place regarded of the same genus‡ as here defined. On looking critically to the detailed description of *G. argenteolus*, and applying it to the authentic specimen of *C. glauca*, there is, with one exception, such a similarity in every character which may be comprised under *form* and *colour*, that I am fully persuaded they constitute but one species. The single discrepancy, like to a specific one, is that of three cirri only being attributed to *G. argenteolus*; but as it is much more easy to overlook two than to distinguish all the cirri,§ I cannot under the circumstances, and at the same time not forgetting Montagu's great accuracy in description, consider this alone a sufficient reason for separation. The localities, too, in which only the *G. argenteolus* and *C. glauca* are hitherto recorded to have occurred, tend further to favour this view; by Montagu the first-mentioned was obtained on the south coast of Devonshire, where it has not since been observed; but by Mr. Couch the latter was some time afterwards procured on the adjoining shores of Cornwall. It is in the present communication that the range of this genus is for the first time shown to extend beyond the South-West of England. Finally, with a full belief of the identity of Montagu's and Couch's fishes, although they have hitherto been regarded by naturalists without any specific reference to each other, I would suggest that the name applied by the former author should be retained, and that *Couchia argenteola* be applied to the species.

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* The absence of cirri is not given as a character, as better vision than mine may yet detect them.

† The name of *Whitebait* (*Clupea alba*), which Montagu mentions as applied to the *G. argenteolus* by the fishermen, however erroneously, is sufficiently indicative of its Clupea-like aspect.

‡ Montagu remarks of the *G. argenteolus*, that "the whole fish is of a silvery resplendence except the back, which is blue, changeable to dark green;" and that the three-bearded cod he has "taken of all sizes, from the most minute to its full growth of 16 or 17 inches, and never observed it to vary in colour, except as it grows large it becomes more rufous, and throws out spots, which is never observed till it exceeds 6 or 7 inches, but is invariably rufous-brown in its infant state." As a general description, this is equally applicable to the five-bearded cod (*Mot. quinquecirrata*), of which I have, however, taken spotted examples smaller than has been just noticed. Specimens now before me of different sizes, from $1\frac{1}{4}$ to $5\frac{1}{2}$ inches in length, are of a tolerably uniform brown colour on the head, back, sides, and fins, varied only in the larger individuals by yellowish white at the anterior part of the under surface of the body, and in the smaller by the white extending to the lower portion of the opercle, and here, as well as beneath, faintly tinged with silver.

§ As before stated, cirri could not be detected in any of the Strangford specimens; lest this should be owing to want of discrimination on my own part, they were submitted to two scientific friends who are well accustomed to the use of the microscope; but neither could they detect any cirri under it, nor with the aid of a lens: the specimens, it must be remembered, were small. It is only by very close examination that four cirri can be perceived on the upper jaw of the large English *C. glauca*. "Cirri three, two before the nostrils and one on the skin," are Montagu's words, leaving us in doubt on which jaw he perceived the third cirrus.

Specific characters.—*Couchia argenteola.* Upper jaw the longer, 5 cirri, four c the upper, one on the lower, jaw; ventrals moderate (from $\frac{1}{6}$ to $\frac{1}{7}$ the length the head), and of a whitish colour; sides silvery.

At a meeting of the Dublin Natural History Society, March, 1851, M Andrews made the following remarks on this species:—

"Among the few specimens presented to your notice this evening is one th appears to be extremely rare, and, as far as I am at present aware, the first reco of its capture on the Irish coast—the *Motella glauca*, or, as it is provincially term on the Cornish coast, 'the Mackerel Midge.' I obtained this beautiful litt fish in July last, off Ventry Harbour, Dingle Bay. Several specimens we brought up in 27 fathoms water, adhering to the trawl-net, the soundings ve fine soft sand. With it I collected five specimens of *Gobius minutus* and *Gobi bipunctatus*, showing the depth of water that these fish frequent, as well as t shoaler grounds of a harbour. The mackerel midge, as the name implies, exceedingly minute in size, being scarcely $1\frac{1}{4}$ inch in length, yet perfect in proportions, and characteristic of the true *Motella* or rockling. It possesses fo pointed barbules in the upper jaw, one in the lower, its anterior dorsal fin i perfectly defined, in other details similar to the rockling. The most striki feature is the extreme beauty of its colouring when captured alive, the shades the sides and back being ultramarine and purplish-green, the belly silver It quickly dies, and these colours soon fade to a dull bluish-green, or a leade hue. It has been noted of a very pretty little species peculiar to the Medite ranean, the *Motella fusca*, that in the living state its appearance is of a fi chesnut colour, but after death changes to a dull yellow. The account given the most recent work on British Ichthyology, Yarrell, of the *Motella glauca*, from the MS. of Mr. Couch, who observes that it has been found abundant on the Cornish coast, yet that some summers it does not appear."

Ciliata glauca, or *Couchia minor*.—It is identical in species with th specimens obtained by me in Strangford Lough in the summer of 183 and described under the name of *Couchia minor* in the 2nd vol. of th Ann. N. H.*

Couchia minor. Thomp. Ann. vol. ii. p. 408.—I leave for further obser ation to throw additional light upon. Greater experience leads me t believe that the individuals described may have been too young t present the character of the adult fish; still the notes may be worth re printing.

Motella glauca.—My fish is marked in a London note as identical wit Yarrell's specimen of *Ciliata glauca*. *April*, 1846, Mr. Yarrell gave me specimen of Couch's *C. glauca*, with which at a superficial view (i. e without resorting to a lens) my fish from Strangford is identical. Th greater comparative length of its P. fins I consider only marks its juve nility. †

In June 22nd, 1844, Mr. Hyndman took, floating on the surface in th Kyles of Bute, a fish identical with my *C. minor*, in P. fins, size, &c.

THE PLAICE, *Platessa vulgaris*, Cuv.,

Is abundant around the coast;—in the North it is by far the most com mon species of flat-fish, and consequently the cheapest, but it is neverth less in general estimation for the table.

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* See my Report, p. 400.

† As the last number of the Annals completed a volume, it is now too late notice in its ordinary place a typographical error there committed. I take th opportunity of correcting it. At p. 424, under references to pl. 16, "for *Couch glauca*, read Fig. 3, *Motella quinquecirrata*."—*Ann. N. H.* vol. iii.

Mr. Yarrell, in dwelling upon the manifold evidences of design in the *Pleuronectidæ*, or flat-fishes, remarks, "having little or no means of defence, had their colour been placed only above the lateral line on each side (i. e. in accordance with its disposition on ordinarily formed fishes), in whatever position they moved, their piebald appearance would have rendered them conspicuous objects to all their enemies,"—vol. ii. p. 298, 2nd ed. Even further than this provision is made for their safety, at least when in a young state. My friend Dr. J. L. Drummond informs me that he has particularly remarked young plaice in Larne Lough to accord in colour with the bottom which they frequent, viz. those on a sandy bottom being of the colour of the sand, and those on muddy ground the colour of the mud—in each case being hardly distinguishable except when in motion.

Mr. Yarrell (vol. ii. 304) notices flounders so changing; and, it may be presumed, of all sizes.

Some friends resident in Banffshire and other parts of the eastern coast of Scotland have informed me that the plaice (so called by them) is held in such little estimation that they never saw it brought to table. It however served another purpose, as all the examples that were available were opened for the beautiful shells found in their stomachs. Some of these, which were preserved and kindly sent me by C. G. M. Skinner, Esq., were finely coloured examples of the *Pecten obsoletus*. Mr. S. remarks, that these shells have been obtained from the stomach of the plaice in the Moray Firth, and on the E. coast of Scotland generally.*

Mr. B. Meenan considers that trawling has diminished the number of fishes of all kinds that spawn where the trawl is used, although ground that has been dredged over is the best to shoot lines on for cod-fish, &c., as the latter go there to feed, in consequence, apparently, of food being turned up. On "foul ground" great numbers of flat-fish are taken along the Antrim and Down coasts on long lines. Lug-worms and pieces of the flesh of conger-eels and herrings, especially the latter, are used for bait.

The Rev. G. M. Black told me, that by trawling on a forenoon in the summer of 1842, at Red Bay (Co. Antrim), he took upwards of four hundred good-sized plaice; they were captured on a beautifully clean sandy bottom, the net coming up pure as possible.

With reference to the season at which the plaice spawns, I may mention that on 1 Jan., 1835, an example only 3 inches in length was sent to me from the Down coast. I have examined specimens 2 inches in length, and found them to agree in fin-rays and all other characters of form with the adult fish.

Food. My notes on the food found in plaice are as follow:

Of specimens taken in Belfast Bay, July, 1838. Stomach and intestines of a plaice examined by Dr. J. L. D. and myself, crammed with *Tellina tenuis*, with the exception of one or two fragments of minute shells of *Mactra solida*. Same month one examined filled entirely with shells of the *Mytilus edulis* about ½ an inch in length. *August*, contents the same. *March 39th*. Of two individuals examined, one was entirely filled with the young of *Mytilus edulis*, of which the examples only two or three lines in length displayed the dark blue stripes from apex to base of shell, that

* The Clams (*Pectenidæ*) are rare with us, excepting the small *P. obsoletus*, which is the favourite food of the flounder, from the stomach of which many specimens can generally be obtained.—*Dr. Johnston, Berw. Nat. Club*, 1835, p. 80.

are exhibited in the adult variety. The other was filled exclusively with the *Amphitrita auricoma*.

June 10*th*, 1843. Stomach and intestines of very large plaice contained ten full-grown *Aphrodita aculeata* and remains of several *Buccinum undatum*, of which two shells of mid growth or size were *perfect;* also remains of two species of Decapod Crustacea.

April 9*th*, 1848. Stomachs and intestines of two large plaice examined at Belfast wholly filled with *Lucina radula*.

Amphidesma prismatica, *Amphi. Boysii*, *Tellina tenuis*, *Trochus cinerius*, *Echinocyamus pusillus*, sent me by Dr. Farran in 1843, as from stomachs of *plaice* bought in Dublin market.

April 21*st*, 1848. Stomach and intestines of one caught in Belfast Bay (a large fish) almost wholly filled with *Solen pellucidus*, in fragments; in addition were fragments of young *Mytilus edulis*, a *Corbula striata*, a valve of *Venus laminosa*, *Amphidesma Boysii*, and *Amphidesma intermedia*.

July 1*st*, 1848. Stomachs of three taken at Groomsport were filled with remains of *Solenes* (razor fish), almost wholly of *S. pellucidus*, but these mixed with the young of the larger species.

Mr. Hyndman informs me that he has at various times looked to the contents of the stomachs of plaice bought in Belfast market (in all upwards of a dozen), and that in every instance he found only fragments of *Tellina tenuis*.

The *tenacity of life* exhibited by this species is very great. An individual about 10 inches in length, taken by Mr. G. C. Hyndman and myself on third Jan., 1835, lived 30 hours after being removed from the water: it was kept for ten hours in a very warm room and lay on a dry plate all the time.

May 1*st*, 1846. I bought a full-grown plaice in Belfast, the upper side of which was marked as usual with orange spots, and the anterior half of the lower side was of the same hue as the upper side.*

The Flounder or Fluke,† *Platessa Flesus*, Cuv.,

Is common around the coast.

This species is not confined to the sea, but is also taken in brackish water and in rivers where the water is perfectly fresh. It is the only one of our flat-fishes known to me as inhabiting water of this nature.

Although brought to Belfast market in considerable numbers, the flounder is not much esteemed here: the plaice is in greater estimation, and one hundred of it are sold for one of the former.

April 10*th*, 1851. The contents of the stomachs of three flounders which I examined consisted of *Rissoa ulvæ* much broken up.—(See foot-note to last species).

Reversed varieties of the flounder are of occasional occurrence on the Irish coast: Dr. Ball says they are not uncommon at Youghal, and they also occur in the North.

The colours of the flounder are vrey various; I saw two examples in Belfast market on 9th March, 1836, that exhibited the orange spots o the plaice; one was full grown, the other about 9 inches long. I ne

* A specimen of 12 lbs. weight obtained for the Dublin University M seum.—*R. B.*

† Generally called *Fluke* in Ireland. In Belfast Bay it is sometimes cal *Black-back*, to distinguish it from the other species of flat-fish.—Mr. Yarrell m tions flounders of a dark colour being called *Black Butts* at Yarmouth.

saw a plaice with a greater number of orange spots, or having them of a brighter colour, than this latter specimen.

Jan. 20th, 1837. Mr. Savage of Portaferry sent a female flounder to the Belfast Museum, thinking it very rare on account of being coloured on both sides.*

It is 9½ inches long, of the ordinary greyish and olive-brown entirely over on both sides, with round dull orange-brown spots of different size, and chiefly near the D. and A. fins. The *colouring* here described I have frequently seen, and I only notice this specimen for what is *really* singular, a malformation of the head just similar to what is represented of the *Brill* in Yarrell's Fishes, vol. ii. p. 242. It is preserved for the Museum. The stomach was filled with soft matter.

In July, 1833, I saw a man catch some flukes about a foot in length, near the mouth of the Bann, in the following manner. He had a wooden instrument in the form of two sides of a garden reel with a spike, which is stuck in the ground; to this there are about forty yards of a line with hooks attached, and a very heavy sinker, with the aid of which the line is flung into the water at full length. The hooks are baited with pieces of crabs (*partans*), by which name only they are known to the fishermen.

THE DAB, *Platessa Limanda*, CUV.,

Is found around the coast, but does not occur in such numbers as to be a commonly-known species.

Owing I presume to its not being much brought to market, Templeton noted it as "a rare fish in Ireland." Rutty names it as a Dublin species, and it is mentioned in Smith's Waterford as taken there. Dr. R. Ball includes this among the Youghal fishes, and Mr. M'Calla stated that it is pretty frequent on the Galway coast. The dab is seldom seen in Belfast market, where—by the very few who know it from the flounder—it is much esteemed. To my taste it is a high-flavoured, excellent fish.

Five specimens about 1¾ inch in length were dredged up by Mr. G. C. H. and myself at Ballyhome Bay (County Down), on Sept. 3rd, 1834. These agreed with Donovan (pl. 44), in figure and description, fin-rays, medial line, &c., corresponding. There were however a few black spots and markings over the body and fins of all five specimens; they had all besides at the base of D. fin about six round white spots at regular distances, and about four similar white spots regularly disposed at base of anal fin.

This species is very commonly taken in the dredge in Belfast and Strangford Loughs of small size, under 2 inches; these almost invariably, if not always, have exhibited the white spots described.

The contents of the stomach examined at various periods mainly consisted of the young of *Mytilus edulis*; *Solen pellucidus*; *Nucula*; *Cardium*; *Pagurus Bernhardus*; and *Aphrodita aculeata*.

March 7th, 1837. I got a dab from the mouth of a Ling-fish in Belfast market. It is 6 inches long, D. and A. fin-rays as in Yarrell; a spine before the A. fin; colour pretty uniform, yellowish brown, but with a round white spot at the lower base of P. fin, and several similar round white spots on the body at the base of D. and A. fins. Upper side rough, under side smooth, except on lateral line and some way in from D. and A. fins. P. fin considerably shorter on under than upper side.

* [A flounder with both sides of a uniform dark colour was sent from Portaferry to the Belfast Museum in March, 1853.—ED.]

D. 78; A. 62 (spine not counted); C. 18; P. 11 on each side; V. 6; D. commencing above middle of eye.

March 15th, 1837. I bought a dab in Belfast market.

Its length is 10½ inches.

D. 74; A. 60 (spine not counted); P. 12 (on each side); V. 6; C. 18 (in all).

Before the A. fin is a short strong spine; P. on upper side considerably longer than on under.

Both sides rough throughout.

"*Teeth* sharp, a little distance from each other." *Jen.* p. 456.

Colour, entire upper side, including D., A., and C. fins, brown, of different shades begrimed with black; on these fins and in some parts of the body many inconspicuous roundish spots of a brownish orange over the body, similar to what I have remarked on *Pleuronectes Flesus*; P. fin brownish orange.

Eye, pupil dark blue, irides golden, a little obscured by brown.

On dissection it proved a female, the ova extremely minute.

Its stomach contained fragments of one of the bivalve shells, *Solen* (neither of the 2 smaller species), and of corallines, amongst which *Sertularia dichotoma* was apparent.

THE LEMON DAB, OR SMOOTH DAB,* *Platessa microcephala*, Flem.,

Is occasionally taken around the coast, but not in large numbers on any part of it.

I noticed it as an addition to our Fauna in the Zool. Proc. 1835, p. 81, but subsequently learned that it had been known to Templeton. (See his Catalogue afterwards published.) It is occasionally brought from the coasts of Down and Antrim to Belfast market, at all seasons, but especially in spring, and is to my taste a much better fish than plaice, although not just so good as sole, nor so sweet as the dab.

Small specimens are sometimes taken in the dredge in Belfast Bay: one of these, 7¼ inches in length, thus obtained on 3rd Oct., 1846, did not exceed 2½ inches in breadth of body between the bases of the dorsal and anal fins at any part. This specimen I preserved to show the elongate form of the immature fish. Dr. R. Ball has rarely seen specimens from the coasts of Dublin and Cork. Mr. M'Calla notes it as a Connemara fish, but scarce.

March 3rd, 1835. In Belfast market I obtained a specimen of this fish which was taken near Killough (County Down), length 13½ inches.

D. 93; P. 9; V. 5; A. 76; C. 19 (reckoning side rays, comprising in all 4 ?); B. 4, I can only reckon.

This specimen is free from spots, as Donovan describes; it is obscurely marked on the upper side and on D., A., and C. fins with many different shades of brown and grey and dull yellow; the orange stripe round the base of operculum, as figured by Donovan, is very conspicuous.

It proved with roe, on dissection. *Irides* very pale yellow, much clouded with brown.

March 17th, 1835. I bought another example in Belfast market, which was taken at Ardglass. Its length is 16 inches. B. 4? D. 93; P. 9; V. 5; A. 76; C. 19 in all. *Irides* as above. *Colour* as above; under side white in both specimens, and not spotted after the manner described by

* In Belfast market this fish is called *Lemon sole*, which is said to be the name given to it at Bath;—*French sole* at Youghal.

nnant. About an inch behind the bases of pectoral fin on upper side, t nearer the D. fin than its origin, a lemon-formed mark $\frac{3}{4}$ of an inch in gth, and in colour dull yellow, appears in both specimens, whence pro-bly the name. Orange stripe edging the operculum not so conspicuous in last specimen, being clouded a little with brown. The body of this is covered with a thick slime, whence Pennant remarks its name of ear dab originated.

March 18th, 1836. I procured a specimen in Belfast market. Its gth is 10 inches; D. 85; P. 9; V. 5; A. 74; C. 19 in all.

Colour as in first specimen.

It is well described generally by Jenyns. Its stomach contained a *reis* 6 inches long.

April 17th, 1837. I obtained a specimen in Belfast market which was ught from Killough. It is $16\frac{1}{2}$ inches long.

D. 95; A. 78; P. 10 (on both sides 1st ray short); V. 5 (the 4th on upper fin branching from the base); C. 20 in all (an accessory ray interposed between two of the ordinary long rays); P. fins pretty al in size.

Lateral line sloping equally on both sides.

Mucous secretion prevailing much over the fish.

Colour. Entire upper side including head and fins brown of every de, in fact the fish looks like a painter's pallet on which every possible de of brown was dashed at random. A stripe of orange on posterior ge of operculum only below P. fin, a line of pale reddish-white marks remaining edge of operculum; lips brownish red. No lemon-formed rk, as in other specimens I examined (see notes); under side wholly re white.

On dissection it proved a female exhibiting a vast number of ova out half the size of ordinary clover seed. The stomach was filled th specimens of *Nereis*, some 6 inches long, nothing whatever else peared.

HE LONG ROUGH DAB, OR SANDNECKER, *Platessa Limandoïdes*, Jenyns.

A specimen of this rare fish was obtained by Mr. W. Todhunter, off ape Clear, in the winter of 1848. The specimen is now in the Dublin niversity Museum.

THE POLE, CRAIG FLUKE—called White Sole in Ireland—
Platessa Pola,* Cuv.,

taken on the North-East, East, and South-West coasts.

Mr. Yarrell, in his Br. Fish., vol. ii. p. 316, published in 1841, after tioning two specimens of this fish, adds, "these are the only examples this fish taken in our seas that I am acquainted with. He was not, vever, aware that I had noticed the sp. in the Zool. Proc. 1837, and given the following detailed descriptive account in the Annals for t., 1838:—

Platessa Sola, Cuv., Pole. — On April 26, 1837, I procured in Belfast ket six specimens of this fish, which had been taken along with turbot, &c., rdglass, on the coast of Down. Such is the difference in the number of rays

* Not the *P. Pola* of Cuv., according to a writer in Weigmann's *Archiv.*, who es Yarr., Jenyns, Thompson's *P. Pola* as *Pleuronectes cynoglossus*, Linn.: e is the same as Yarr. and Jenyns's fish, called *P. Pola*.

in their fins, especially in the anal, that it seems to me desirable to be noticed at full length.

No. 1.	Length	$14\frac{3}{4}$	inches;	D. 102;	A. 89;	V. 6.
2.	—	$14\frac{1}{2}$	—	102	88	6
3.	—	$14\frac{1}{4}$	—	108	92	6
4.	—	$13\frac{1}{2}$	—	110	100	6
5.	—	13	—	102	86	6
6.	—	12	—	106	91	6

No. 1.	P. 12	on upper,	10	on under side;	C. 19 à la Cuv.,	or 23 altogether.
2.	12	—	10	—	19 —	23 —
3.	11	on each side;			19 —	23 —
4.	11	—			19 —	25 —
5.	12	on upper,	10	on under side;	19 —	23 —
6.	11	—	10	—	19 —	22 —

"Branchiostegous membrane in each specimen consisting of five rays; in each likewise a short strong bony spine, directed forwards before the anal fin, but which cannot be called a spinous ray: in some individuals the skin covers it, in others the point is exposed.

"With the short specific characters in the Manual of British Vertebrate Animals these individuals agree, with one exception, that of the lateral line not being 'straight throughout its course,' although it is nearly so;—from the origin it slopes gently over the pectoral fin, and thence to the tail is straight. They correspond in every detail with the general description in the same work, except in the following particulars, in which the specimens exhibit considerable difference. Mr. Jenyns remarks, 'greatest elevation of the [dorsal] fin contained five times and a half in the breadth of the body,' p. 459; in some of these it is contained but $3\frac{1}{2}$, in others 4 and $4\frac{1}{2}$ times, and this is not owing to difference of size in individuals; in the female specimen, which is of the largest size, the dorsal fin is rather lower compared with breadth of body than in the others. In the individual examined by Mr. Jenyns, the ventral fins are described to have equalled the pectorals in length, but in all these the latter are considerably longer, in some being one-third, in others one-fourth longer than the ventrals. With Mr. Yarrell's description they generally agree.

"The *colour* of the upper side of these six specimens is one uniform tint, intermediate between the 'yellowish brown' and 'wood brown' of Syme's 'Nomenclature of Colours.' The fins are all merely of a darker shade, owing to the membrane being minutely spotted with a deeper brown; the hinder portion of the upper half of the P. fin is black, thus resembling this fin in all the British species of sole; 'the edges of all the fins darker than the rest,' as described by Mr. Yarrell; the under side of the three larger is pure white, of the three smaller white also, but closely dotted over with extremely minute black spots, which, without close examination, give to this portion the appearance of soiled white; pupil purplish black; irides silvery, in some of them tinged with gold.

"On dissection, five of these individuals exhibited milt, and one of them roe; the ova of a very small size, and the milt not much developed. Excepting the stomach of one, which was empty, they all contained a few fragments of *Solen pellucidus* or *minutus;* in addition to this shell, three of them exhibited the remains of *Ophiuræ;* one, besides the *Solen* and *Ophiuræ*, presented some crustacea; and another, in addition to the *Solen*, the remains of marine worms, apparently *Planariæ*.

"On May 5, 1837, I obtained a seventh specimen of *P. Pola*, which, like the others, was taken by trawling, at Ardglass. It was $12\frac{1}{2}$ inches long, and exhibited milt moderately developed. Its stomach contained fragments of *Solen pellucidus*, and a specimen of *Bulla lignaria*."—*Annals Nat. Hist.* vol. ii.

March 25, 1839.—A small creel-full of these fishes was brought to Belfast market from Newcastle (Down), near to which place they were taken by trawling. There were about 120 of them, and with them were a *Pleuronectes Megastoma*, a *Platessa microcephala*, both full grown, and

) very small specimens of hake (*Merlucius vulgaris*) about a foot in
ngth: all were captured at the same haul. The four last-named speci-
ens I bought, together with seven of the Poles. Of these, four were
tween 14 and 15 inches long, two between 15 and 16, and one 16½
ches in length. All but one were females. In the largest the ova were of
e greatest size, or 1-16th of an inch each in diameter: in the others they
ere very well developed. Of their stomachs, 1 was empty, 3 contained
ly the remains each of one ascidia-like animal, 1 fragments of a shell
olen pellucidus) and a Planaria-like worm, and 2 contained each the
mains of one crustacean. The under side of the head in all was marked
h numerous *dimples* of the size that a pea would make.

The form of the body and height of the D. and A. fins varied consider-
y, as in those before examined, though in that case they were generally
les, as in this they are females. The fins are not lower in these
ales than they were in the males then examined: in this respect there
o sexual difference.

On inquiry of the man who brought these fish from Newcastle, he said,
h a take of *White Sole*, as he called them (and as they were named in
market by the dealers), had never been known there before, and he
for many years been a fisherman. About 70 more of these fishes had
n taken at the same time, although not brought to Belfast. He never
ore knew more than "an odd one" to be captured. The *Whiff* he would
lude under the name of the *White Sole*, I presume, as he had not re-
rked the individual I got to differ from the others.

The Pole being unknown in the market here, they met with a miserable
e. I bought 4 of the best for 1*s*. (sole would have been 4*s*.) on the
t day, and the next day I saw about 35 couple that seemed unsaleable.
We had five of them dressed for dinner, and considered them passably
od fish, but not at all flavoured like, nor equal to, the sole. Cuvier
arks that in Paris the *Pl. Pola* is as much esteemed as the sole; but
s not so in Ireland. In Dublin, where the *White Sole* is well known, it
eckoned so inferior that the cry of the peripatetic fishwomen is, "had-
k and *black* sole," by which latter name the *Solea vulgaris* is distin-
shed from its lighter-coloured congener. They are much thinner than
es; indeed I would think that almost twice as much food is on a sole
equal size as on one of them. To close sales, 54 of the lot already
ntioned and of considerable size were on the second day sold for 2*s*.

THE HOLIBUT, *Hippoglossus vulgaris*, Cuv.,

occasionally taken on all parts of the coast.

Since my attention was first given to fishes, not more than seven or
ht holibuts in the year have been brought to Belfast market.

Thirteen examples, noted down as seen here by me within a few years,
re chiefly taken on the coasts of Down and Antrim, including Belfast
y, where they occur from December to March inclusive. In one
tance only were two offered for sale on the same day; the largest of
se did not exceed 5 feet in length and 120 lbs. in weight; but examples
ighing 1¼ cwt. and 2¾ cwt. have been brought to Belfast market. This
t one was captured at Ballywalter (Co. Down) some years ago.

The holibut would seem from the testimony of English authors to be
le esteemed; but though deficient in any high flavour, like the turbot
d the sole, I consider it a very good fish, as do numerous friends whom
ave prevailed on to try this giant of our flat-fishes.

Some years ago it was unsaleable in our market, but it is now readily
d at 4*d*. per lb.

It is generally taken on cod lines, and with the buckie (*Bucc. undatum*) as bait. (*Templeton* too has noticed this.) The fishermen tell me that it is a simple fish and easily killed, and that they never lose one in consequence of its weight.

From the stomach of a holibut I once took ten full-grown sprats, the two largest 5¾ inches long, and a fragment of *Millepora polymorpha*. Another, of about 120 lbs. weight, exhibited the remains of a ray (or skate), the tail alone of which was about a foot in length. The position of the victim showed that it had been swallowed head-foremost. Another was filled with crabs, and contained a valve of *Venus Cassina*. On all the holibuts I have seen recent, were specimens of the parasite *Hirudo hippoglossi*, Muller.

May 1, 1846.—One of 90 lbs. weight in Belfast market contained only three of our edible crab, *C. pagurus*. They were each about 4 inches across the shell.

Nov. 19, 1847.—The stomach of one (a small one 2½ feet long) was filled with the remains of well-sized *Portuni* (*P. depurata* was distinguishable) and *Ophiura rosula*, of which last there was a large quantity.

THE TURBOT, *Pleuronectes maximus*, Linn.,
Rhombus — Cuv.,

Is taken around the coast, and is the most highly valued of all our flat-fishes.

Rutty says—"It is a delicious fish, and for its excellent taste is called the Pheasant of the water." Vol. i. p. 350.

Mr. Bernard Meenan informs me that—

"he once got at Magilligan 22½ dozen of turbots, which were taken in one day, average 18 lbs., or 7 to 30 lbs. Above three times that number were taken by five boats on the same day, and all on long lines. Fresh herrings he considers the best bait for them or for any other fish. He states that in 1844 one 261 lbs. weight was taken in Belfast Bay, within 1½ mile of the town."

Average price in Belfast market 6*d.* to 7*d.* per lb.

Some years ago one was taken near Springvale, Co. Down, by the late Geo. Matthews, Esq., that weighed 44½ lbs. My informant saw it weighed. It was captured in a trammel-net in 4-fathom water.

12*th March*, 1835.—I purchased a turbot in Belfast market of which the following are particulars:—

Length, 13 inches.

D. 67; P. 12; V. 6; A. 47; C. 15; B. 6.

Irides as in Brill bought same day.

Upper jaw the longer when the mouth is closed.

Tubercles very prominent on upper side; under side entirely free from them.

This specimen agrees well with Donovan's figure.

On dissection this fish exhibited roe which was not well developed. In its stomach was a very long intestinal worm alive, strongly resembling the human tapeworm.

"No place is better supplied than Londonderry with this fish. I have bought a large one for 2*s.* 8½*d.*"—*Sampson's Derry*. [2*s.* 6*d.* present currency.—ED.]

Newcastle, Co. Down, Sept. 16*th*, 1851.—To-day, and for several days past, the weather has been so calm and the sun so bright, that large quantities, chiefly of flat-fish, have been taken with spears off Newcastle. These spears are 32 or 33 feet long, with an iron barb at the end, and the fishermen, seeing their prey at the bottom, even several feet deeper than the length of the spear, drive it at them, and the fish when struck rises

the spear to the surface. Fish, greatly finer than I have seen taken ring the season on lines, have been captured in this manner for the last days. Turbot between 20 and 30 lbs. are sometimes so taken. Even rnard are captured with the spear. There is no rope fastened to it, t the fisher might retain in his hand.

The above is one fisherman's (Sterling's) account. Another (Mason) s me that he always holds his spear by the top when striking at a fish.*

THE BRILL, OR BRITT,† *Pleuronectes Rhombus*, Linn.,
Rhombus vulgaris, Cuv.,

common around the coast and taken with the turbot, but is in much ater abundance than that fish, on the North-east coast at least 4 to 1. t brings a good price in Belfast market, but not more than half that of bot. It is considered best in spring. The largest I have seen here 2 feet in length.

A fine large fish of this species once attracted my attention here in umn by the beauty of its colour. It was covered over with large llate white markings on a very rich-coloured dark "ground," looking cisely as if a shower of snow had fallen on it.

March 12, 1835.—I purchased a specimen in Belfast market, which was follows:—

Length 15 inches.

D. 76; P. 11; V. 6; A. 60; C. 15; B. 6.

This fish agrees tolerably well with Donovan's figure; the lateral line, wever, turns abruptly upwards over the pectoral fin, and is not gradually ped as in Donovan's figure; white spots not so numerous as in the ter.

Irides golden for about a hairbreadth round the dark blue pupil, a *sub-escent*-formed silvery mark occupying the upper portion of upper eye, d the lower portion of lower eye.

Lower jaw longest when the mouth is closed.

BLOCH'S TOP-KNOT, *Pleuronectes punctatus*, Bloch,
Rhombus — Yarrell,

s been obtained on the North-east coast.

The following communication was made by me to the Annals Nat. Hist. ii. p. 271.

Pleuronectes punctatus, Bloch. Bloch's Top-knot.—One of these very rare es, of which two British specimens only are on record (the first obtained at and and the other at Weymouth), was taken on the 16th of June last [1838], Dr. J. L. Drummond, when dredging within the entrance of Belfast Bay. ether with the other fishes at the same time captured, comprising specimens *Solea Lingula* and *S. variegata*, it was with kind consideration promptly sent me.

"The following notes were made from the recent specimen: length 4¾ inches; mber of fin-rays,

D. 72 and 3; A. 56 and 5; P. 10;‡ V. 6; C. 16 in all.

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* Turbots with head reversed occasionally occur in the Dublin market. ose sent from Derry that I have seen are marbled with white on the back.—*Ball.*

† Universally called "*Britt*" in Belfast market.

‡ The dorsal fin, strictly considered, has but seventy-two rays, and the finlet nected with it extending under the tail three rays; of these the two first ide near the base, and each division becomes forked; the third ray divides three near the base, each division likewise becoming forked. The anal fin independently of a similar finlet, fifty-six rays; finlet with five rays, the

"Compared with a specimen of *P. hirtus*, Mull. (6½ inches in length, and likewise taken on the coast of Down),* the ridge between the eyes is much more elevated, the difference being strikingly conspicuous when the two species are placed together; lateral line on both sides much arched within the range of the pectoral fins, thence straight to the tail.

"The upper side presents as a ground colour a mixture of various shades of light brown, with a round dark spot, 3 lines in diameter, commencing an inch from the tail; it is likewise marked with a very few smaller inconspicuous round dark-coloured spots, and blotched irregularly with very dark rich brown. The fins do not exhibit any round spots, as shown in Dr. Fleming's figure (Phil. of Zool., vol. i. pl. 3), but are all irregularly marked on the upper side with many different shades of brown; irides reddish-golden; under side of body white, with a very pale reddish tinge. In all characters not mentioned here this specimen accords with Mr. Jenyns' description (p. 462).

"With Mr. Yarrell I agree in considering the *Rhombus unimaculatus* of Risso (Hist. Nat. l'Eur. Mer. t. iii. p. 252, f. 35) identical with this species. In the number of rays in the fins, individuals appear to differ considerably, but perhaps not more so than might have been expected when so great is their number."

August 19th, 1844.—Mr. G. C. Hyndman, when dredging in Belfast Bay, between Carrickfergus and Graypoint, in from 3 to 6 fathoms water, captured two fishes of this species 3 inches each in length—beautiful little creatures, which I have preserved. See Zool. Proc. 1837, p. 60.

Top-knot Flounder, *Pleuronectes punctatus*, Penn., vol. iii. p. 322, pl. 51.

March 25th, 1835.—I procured a specimen of this fish in Belfast market, which was taken at Ardglass. The fish-venders had not seen a similar specimen before. Its *length* is 6½ inches. B. 7; D. 95; P. 6 rays on the upper and 11 on the under fin, the rays on the former longer and much stouter than in the latter; V. 6 (which are not only connected by a membrane with the A. but look in profile like a continuation of this fin); A. 69; C. 17 (in all).

In the above enumeration of the D. and A. fin-rays, the rays in the *finlets* at the posterior extremity of each are not reckoned. These finlets have a very singular appearance, and are each composed of several single bifurcated and trifurcated rays; they should perhaps be called second D. and second A., though from being placed on the under side these terms might be misapplied.

Colour of upper side, including all the fins, dark brown marbled over and obscurely spotted with darker shades of brown; a small silver spot at base of P. fin is all the contrast that appears to the general brown appearance, a band of very dark brown runs in an oblique direction towards the back from the upper eye, and a similar one towards the vent from the lower, under side white, D. and A. fins broadest towards the posterior extremity.

Irides silvery clouded over with brown, pupil black, no sea-green appears, as described by Pennant ("la prunelle est noir et l'iris d'un verd de mer," Bloch, vol. ii. p. 238); but the specimen, though quite fresh, may possibly have lost this appearance. Lateral line on upper side has three turns within the first or anterior portion, comprising about 1¼ inch; thence to tail quite straight. Lateral line on under side differs in some degree from this.

Both jaws very thickly set with teeth.

Lateral line strongly marked on upper side, though stated "to be rather indistinct" in Dr. Fleming's specimen (Wern. Mem. vol. ii. p. 241).

"*Jaws* nearly equal," as described by Fleming.

Breadth of body, exclusive of fins, 2 inches 7 lines.

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three last dividing each into two near the base, which divisions again, as in the opposite one, become forked. This explanation will perhaps account for the less number of D. and A. fin-rays set down to the present specimen than is generally attributed to the species. The divisions here mentioned have probably been reckoned as distinct rays. Pectoral fin larger on the upper than on the under side; ten rays in each.

* See Proceedings Zool. Soc., 1837, p. 60.

MULLER'S TOP-KNOT, *Pleuronectes hirtus*, Mull.,
Rhombus — Yarrell,

Has been taken on the East coast.

As noticed in the Zool. Proc. 1835, p. 81, I procured, on the 25th March that year, a recent specimen of this fish (6½ inches in length), which was taken at Ardglass, County Down, where it must be very rare, being quite unknown to the fishermen.

The following more lengthened notice of this individual was published in the Zool. Proc. for 1837.

"*Pleuronectes hirtus*, Mull. Muller's Top-knot.—If not inconsistent with the brevity characteristic of the 'Zoological Proceedings,' I would remark that the fish which I exhibited at the meeting of this Society, on June 9th, 1835, under the name of '*Pleuronectes punctatus*, Penn.,' is identical with the '*P. hirtus*, Mull.,' of Mr. Jenyns's Manual of the British Vertebrata, and the '*Rhombus hirtus*' of Mr. Yarrell's British Fishes, a circumstance which reference to the synonyma of this species might indeed indicate, but I am induced to notice the subject on account of the specific name '*punctatus*' being applied in both works to a nearly allied species.

"My specimen, critically examined when recent, exhibited the following characters, which are unnoticed in the description of *P. hirtus*, given in the above-mentioned works.

"P. fin, which is quite perfect, on the upper side 9½ lines long, and containing 6 rays; on the under side 6½ lines long, and having 12 rays. Lateral line on the under side less strongly marked than on the upper, and considerably less curved towards its origin. A bright silver spot, two lines in diameter, at the base of the P. fin on the upper side; irides silvery, clouded with brown: they are described as sea-green by Hanmer (Penn. Brit. Zool., vol. iii. p. 323, ed. 1812). It is in allusion to this individual, which I had the pleasure of showing Mr. Yarrell, when in London in June, 1835, that he remarks, 'I have a record of one [*Rhombus hirtus*] that was caught on the coast of the County of Down in Ireland.' Brit. Fish. vol. ii. p. 245.'—*Zool. Proc.*, 1837.

On 30th September, 1842, Dr. Ball obtained one of these fishes 7¾ inches in length, on Kingston Pier, where it had just been captured by a boy, from whose "string of fishes" he selected it. Dr. Ball sent me an accurate drawing of the specimen, accompanied by the following note:

"The dorsal and anal fins are almost continuous, being interrupted only by the mouth; they pass under the tail, and are orange so far as they are shaded by the tail, where they are in apposition."

Two more specimens have been obtained in Dublin, one by the late Surgeon Carmichael, and one by Robert Warren, Esq., both sent to the Dublin University Museum.

THE WHIFF,* *Pleuronectes Megastoma*, Don.,
Rhombus — Yarrell,

Is of occasional occurrence from North to South along the eastern line of coast. From the coasts of Down and Antrim single individuals are brought with other *Pleuronectidæ* to Belfast market. They are taken at all seasons.† Dr. R. Ball has obtained specimens at Dublin and Youghal.

The four largest which have come under my inspection, or have been

* Called "she sole" in Belfast market; "ox sole," and also "white sole," in Dublin market.

† A small basket of fish taken about Newcastle (County Down) and brought to Belfast on 2nd Sept., 1843, contained six specimens of the whiff, five of which were about 2 feet in length.

noted by me, were 22, 23, and two of them 23½ inches in length. In the stomach of one I found a *Callionymus Dracunculus* 3 inches in length, and the remains of three small *Gadi*: in another were three examples of *Merlangus vulgaris*, about 3 inches long; a third contained only shrimp-like *crustaceous* animals. A whiff purchased here on Oct. 21, 1836, had just shed her ova, as evinced by a few mature ones only remaining.

The colours of this fish are peculiarly unattractive. Of nine examples of which the colour and markings were noted down, I find that the greater number were of a greyish brown (a washy ground), with blackish markings of a hue as if originally black, but partly washed out. In some specimens small and numerous markings (more so than in Donovan's fig.); in others, several large roundish markings only. Only one example could be called handsomely marked. It was of a rich colour, although light, brown with conspicuous markings all over, but at some little distance from each other, with small dark brown spots.—Under side white without markings.

Whiff? *Pleuronectes Megastoma?* Don. pl. 51.

Length 22 inches.

D. 86; P. 12; V. 6; A. 67; C. 15 (not reckoning lateral rays, of which there are two at each side, making in all 19); B. This specimen, which I purchased from Nichol, was, he informs me, procured by him in Belfast market, late in spring, 1833.

D. and A. fins widest towards posterior extremity, and not in the centre, as described by Donovan and Fleming, p. 196, to be the case in those of the whiff.

Whiff, *Pleuronectes Megastoma*, bought in Belfast market, Oct. 21, 1836. It was taken at Bangor.

Length 22 inches, lateral line as figured by Donovan, but the anterior arch not just so abrupt.

D. 89; A. 67; V. 6; P. 11 (on upper side 1st very short, 4th longest, length 2½ inches); P. 10 (on under side, 1st very short, 6 and 7 equal, and longest 1¼ inch long); C. 17 in all.

Greatest breadth of fish, without reckoning fins, 8 inches, and central between base of tail and upper jaw. It differs from Mr. Yarrell's description in the eyes being *equal*; they are 1 or 2 lines from anterior to posterior (not in diameter, as they are not round), pupil black encircled with a narrow line of silver colour tinged with pale yellow. The arch at the anterior part of the lateral line *much more conspicuous* than the straight line forming its base, and scales similar to those extending posteriorly in straight line to tail.

Colour of entire upper side and fins? but of a greyish brown, with obscure spots much more numerous and smaller than appear in Donovan's figure; under side white.

Pleuronectes Megastoma. See notice of specimen described by me in Oct. 21, 1836.

Jan. 3, 1837. I bought a specimen in Belfast market taken at Ard[illegible] glass. Length 23½ inches, lateral line as figured by Donovan, but the arch not so abrupt posteriorly.

D. 87; A. 69; V. 6; P. 11; on upper side, 10 (on under 1st ray very short on both sides, it and the second ray simple on both sides, remainder branched); C. 17 in all. Branchiostegous membrane, 7; 3rd ray of P. longest. P. 2½ inches long on upper, 1½ inch long on under side. Greatest breadth of body, exclusive of fins, 7½ inches, and central between base of tail and upper jaw.

Upper eye the larger, the socket from anterior to posterior being 1¼ inch, that of lower eye 1¼ inch; the ridge separating them is *not* prominent (see Yarr. p. 253, vol. ii.) though "bony," nor was it so in the specimen of 21st Oct.; pupil blue, encircled with a narrow line of a silver colour tinged with gold.

The arch at the anterior part of lateral line *much more conspicuous* than the straight line forming its base, and scales similar to those extending posteriorly from it in a straight line to the tail.

Colour of entire upper side and fins greyish brown, with a few small dark brown markings, irregular in form and irregularly disposed over it; though perhaps as numerous, these are much smaller than in Donovan's plate, and more irregularly scattered.

This specimen was called "White Sole" in the market.

It proved a male on dissection. The stomach contained only a fragment of some shrimp-like crustacean.

THE SCALD-FISH, OR MEGRIM, *Pleuronectes Arnoglossus*, Schn.,
Rhombus — Yarrell.

A specimen of this very rare fish was obtained by Mr. W. Todhunter on the Galway coast, in Sept., 1848. The specimen is in the Dublin University Museum. It has been taken on the coast of Cork. *R. Ball.*

THE SOLE, *Solea vulgaris*, Cuv.,

Prevails around the Irish coast. On some banks where properly sought for it is obtained in large quantities, and of the finest quality.

Dublin is generally well supplied with them; Belfast not by any means so well—consequently they fetch fully as high, indeed generally higher prices here than in the London market.

The sole of the North of Ireland vary considerably in form and colour, so that when commencing the study of our native fishes, I was, on two or three occasions, induced to purchase specimens so differing, for critical examination: they all proved to be merely *S. vulgaris*.

In the general outline of the body some appertained as much to the form of the solenette (Yarr. Br. Fishes, vol. ii. p. 355) as the sole (p. 347, same work), or in other words, some of equal length were considerably narrower and tapered more to the tail than others.

In colour some were of the ordinary dark brown umber hue, as represented by Donovan; others much lighter, from the centre of each scale being yellowish. In some examples the ground colour is yellowish brown, varied by being marked all over with large and small roundish spots of dark brown. The largest and thickest examples, 20 inches in length and upwards, which I have seen in Belfast market, were of this light hue.

In two specimens 11 inches in length, their greatest breadth (exclusive of A. and D. fins) was less by an inch than 1 to 3 of the entire length. The fin-rays of these specimens differed in number. In one of 13 inches the breadth a little exceeded a third of the length.

Irides of a golden hue clouded with brown.

In their stomachs were small crustacea and marine worms.

Dr. Farran has favoured me with the following notes upon the food of this species:—

"The first examination I made of the stomach of the *black sole* (*Solea vulgaris*) was in the beginning of Oct., 1841. I found in two or three specimens of the fish the *Cardium elongatum* abundantly, but generally broken; with them also a few of the *Bulla aperta*, and a number of specimens (13) of the *Echinocyamus pusillus*; in about a month subsequently

another stomach afforded the *Amphidesma Boysii* of large size, a specimen of *Dentalium*, and a few specimens of *Amphidesma prismatica;* after a like interval the stomachs of three or four individuals were well supplied with beautiful specimens of *Amphidesma prismatica*, *Nucula tenuis*, a small *Anomia*, *Amphidesma Lysteri* (small size). Lens of fish eye. *Donax trunculus*, but in the latter examinations of about a dozen altogether, at different times, all shells have disappeared with the exception of the *Amphidesma prismatica*, and that sparingly; the stomach was filled with a green vegetable substance, and in the last stomach which I examined, I found two specimens of the *Trochus umbilicatus*.

"It is worthy of remark that after October I did not obtain a single specimen of *Cardium elongatum* or *Amphidesma Boysii*, and that, although all the specimens were evidently recent, having the epidermis very perfect, nevertheless, with the exception of *Nucula Tenuis* and *Trochus cinereus* the *shells were all empty*."

The Lemon Sole, *Solea Pegusa*, Yarrell.

A specimen of this fish was obtained by Mr. W. Todhunter on the Galway coast in 1848.

It is now in the Dublin University Museum.

In the 2nd edition of his Br. Fishes, Mr. Yarrell inadvertently mentions this fish as Irish in connexion with my name. It had not then, so far as I am informed, been met with on the Irish coast.

Specimens sent to Dr. Ball. Length 10 inches; breadth of body, exclusive of fins, $4\frac{1}{2}$ inches. Papillary eminences numerous on under side of head, less so than in the *Solea vulgaris*. "Very many specimens were obtained" by Mr. Todhunter, but the exact locality not mentioned. Three specimens were sent from County Galway, Sept. 7th, 1848, by Mr. Todhunter to Dr. Ball; the largest was 12 inches in length; the skin only preserved; it was taken at Bunowen.

The Solenette or Little Sole, *Solea Lingula*, Rond., *Monochirus linguatulus*, Cuv.,

Has been obtained on the North-East, East, South, and West coasts.

The following notices of this species were contributed by me to the Annals Nat. Hist. vol. ii.

"*Solea Lingula*, Rond.,* Red-backed Sole.—On the 23rd of August, 1836, three small specimens of this fish were captured by Mr. Hyndman and myself when dredging on a sandy bottom off Dundrum, in the County of Down.

No. 1.	Length $3\frac{1}{2}$ inches;			D. 68;	A. 56.		
2.	—	$2\frac{1}{3}$	—	72	56.		
3.	—	$2\frac{1}{2}$	—	66	54.		
No. 1.	P. 4	upper side,	2	under side;	V. 5;	C. 18	altogether.
2.	4	—	2	—	5	18	—
3.	4	—	2	—	5	19	—

Breadth of body of No. 1, 13 lines. In form they differ considerably from *Solea vulgaris*, by tapering towards the tail. Dorsal and anal fins similarly connected with the caudal, the last ray of each exhibiting a low inconspicuous membrane which extends to the base of the outer caudal ray—these three fins, merely touching in this manner, appear at a cursory view unconnected. In the number of rays in the fins, and characters generally, they correspond with Donovan

* Solea *parva sive* Lingula, Rondeletius; see his figure of "la petite sole," p. 260; also Willughby's figure and description, p. 102, F. 8, fig. 1.

description of the *Pleuronectes variegatus* (vol. v. p. 117), but differ remarkably from his figure in colouring; nor in this respect do they agree entirely with Hanmer's figure (Penn. Brit. Zool., vol. iii. pl. 48, ed. 1812), with which I consider them identical, as they want the blotches of black represented on the dorsal and anal fins. They also differ a little from each other in colouring, the largest being of an uniform reddish brown on the upper side; the two smaller of a paler shade, with a series of roundish black spots on the body, a short way inwardly from the back of the dorsal and anal fins, and a few similar spots on the lateral line: in one the spots approaching the fins just named are eight in number, in the other they are fewer and less conspicuous. In the three specimens all the fins except the ventral have, at irregular intervals, an occasional ray black; the rays only exhibiting this colour.

"Mr. Jenyns has called attention to the difference of colour and number of rays in the fins of the specimen he examined (p. 468) compared with the individual described by Mr. Hanmer. In both respects it appears the species is subject to considerable variation. Dr. Parnell has more recently described (Mag. Zool. and Bot., vol. i. p. 527) what he considers to be a new species of sole, and names *Monochirus minutus;* but a comparison of my specimens with his description satisfies me of their identity. The specific character of *M. minutus* is, 'every sixth or seventh ray of the dorsal and anal fins black,' which marking appears in the individuals under consideration, though less regularly; their dorsal fins are connected with the caudal as in this fish, although the junction, as before mentioned, is only observable on close examination. Two of my three specimens at the same time display 'blackish spots, which extend beyond the base of the rays [of the D. and A. fins] towards the body of the fish,' a character remarked by Dr. Parnell as distinguishing *M. Lingula* from his new species. My specimens generally possess in common the characters of *M. Lingula* and *M. minutus*.

"In Mr. Yarrell's collection there is a dried specimen, $4\frac{1}{4}$ inches long, from the Mediterranean, identical with mine, and like them displaying conspicuously, at irregular intervals, the black markings on the dorsal and anal fins.*

ADDENDUM.

"*Solea Lingula* and *Solea variegata*. Belfast, June 18th, 1838. Among some small fishes taken by dredging within the entrance to Belfast Bay by my friend Dr. J. L. Drummond, on the 16th instant, and considerately forwarded to me when quite recent, were five specimens of *Solea*, or *Monochirus* (Cuv.). Of these, which with one exception were examined before being transferred to spirits, four individuals, varying from $3\frac{1}{2}$ to $4\frac{1}{4}$ inches in length, are the *Solea Lingula*, Rond.; and one, $2\frac{3}{4}$ inches long, the *Pleuronectes variegatus* of Donovan. In our two latest and best works upon the subject—Yarrell's British Fishes, and Jenyns's Manual of British Vertebrate Animals—these names are brought together as synonymous, or representing but one species, with, however, an expression of doubt as to its correctness by the latter author. A comparative examination of the present examples satisfies me that they apply to two distinct species.

"In placing the individuals together, the most obvious differences appear in the dark blotches and transverse bands of *S. variegata* (*Pleur. variegatus*, Don.) contrasted with the comparatively uniform tint of *S. Lingula;* in the scales of *S. variegata* being very much smaller,† in its eyes being relatively to each other

* Dublin, June, 1838.—A specimen of this sole $3\frac{1}{2}$ inches long, and taken at Youghal, three or four years ago, is in the collection of Dr. Ball. Its upper side does not exhibit any variegation of colours, but is of a uniform reddish-brown hue. The rays of the dorsal and anal fins are occasionally black, as in all individuals of this species I have seen.

† Although I here speak only relatively to the size of the scales of *S. Lingula*, the remark may without explanation seem inconsistent with Donovan's "specific character" of the variegated sole, in which the scales are stated to be "large;"

placed more vertically, in the dorsal and anal fins being rather more distant from the caudal fin, and in the general form of the body, which tapers less towards the tail; the rays too of the dorsal and anal fins are considerably fewer in number than in *S. Lingula*.

"The colour generally of the *S. variegata* is very similar to that of Donovan's figure (British Fishes, vol. v. pl. 117), being of a pale yellowish brown, with the three conspicuous dark transverse markings approximating more the form of bands, and equidistant from each other, the last extending entirely across the body; the indication of a fourth band appears above the termination of the opercle, one (narrow and inconspicuous) at the base, and another near the extremity of the caudal fin; the body is likewise marbled with blackish brown, towards, and spreading over, the base of the dorsal and anal fins; between the bands are faint markings of pale brown; dorsal and anal fins pale yellowish brown, marked irregularly with black towards the tail.

"The four specimens of *S. Lingula*, though not all exactly of the same shade of colour, are on the upper side of a pale brown, entirely and closely freckled over with a darker tint, and exhibiting several small roundish dark brown and white spots on the body at the base of the dorsal and anal fins, and along the lateral line: these brown and white spots are often disposed alternately. The largest individual presents, in addition to them, small white specks over the body generally. Rays of dorsal and anal fins occasionally black. Pupil dark blue, surrounded by a golden ring of about a hair's breadth. The number of fin-rays in my specimen of *S. variegata* are, D. 63; A. 49; P. 4;* V. 4; C. 19 in all. In two of the specimens of *S. Lingula*, varying most from each other in size, there are 72 rays in the dorsal and 56 in the anal fin; two others have the dorsal with 76 and the anal with 58 and 59 rays.

"Both species have papillæ on the under surface of the head, are rough with ciliated scales on the under as well as the upper side, and have the nostrils tubular, but not to such an extent as Risso, terming the projection a 'barbillon,' figures that of his *Monochirus Pegusa*.

"The variegated sole of Donovan and Yarrell appears to be the same, and with it I consider the individual under consideration identical. With Mr. Jenyns's description of *S. Lingula* my other specimens accord, as they also do with Mr. Hanmer's description and figure of the red-backed sole (Pennant's British Zoology, vol. iii. p. 313, pl. 48, ed. 1812), with the exception of the black markings on the dorsal and anal fins, extending over several rays and their connecting membrane, instead of being confined to a single ray, as in all the specimens I have examined.

"It is worthy of investigation whether the *Monochirus Pegusa* of Risso (t. iii. p. 258, f. 33, ed. 1826) be different from the *Solea variegata* here treated of. The figure and description of that species, though not in every respect accordant with each other, present many characters in common with it.

"The *S. variegata* is here for the first time recorded as occurring on the coast of Ireland."—*Annals Nat. Hist.* vol. ii. Sept., 1838.

"By the kindness of Dr. Parnell in supplying me with specimens of the red-

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but a reference to his general description will show that it is the comparative magnitude of its scales to those of the common sole (*S. vulgaris*) to which he alludes, and in which he is correct, as he likewise is in describing those of the latter species to be "remarkably diminutive." The scales of my specimen accord in size with those of Donovan's figure of *P. variegatus*: being reckoned from the origin of the lateral line to the base of the rays of the caudal fin (those on the rays not being enumerated) they are about eighty-five in number; in the specimen of *S. Lingula* examined there are about seventy scales within the same space. The scales lie more closely to the body in *S. Lingula* than in *S. variegata*.

* This refers to the upper side, in which the second ray is the longest, and terminated by a filament; length of this ray and filament $1\frac{1}{2}$ line: P. fin on under side rudimentary, half a line in length, and rays undistinguishable.

backed flounder of Hanmer, Pennant's Brit. Zool. (vol. iii. p. 313, pl. 48, ed. 1812), and the *Mon. minutus*, Parn., I am enabled to speak decidedly on some points which, in my previous remarks on these species, Annals Nat. Hist., vol. ii. p. 19, could only, from a want of specimens, be treated of problematically. This I now proceed to do as supplementary to what appeared in the Annals; but it may be well, in the first place, to give a slight sketch of the British *Monochiri*, in so far as our present knowledge extends.

"The first British *Monochirus* I am aware of being noticed, is that figured under the name of Variegated Sole in Donovan's British Fishes (pl. 117), the individual represented having been purchased in the London market in April, 1807, but where captured is not mentioned. In the edition of Pennant's British Zoology, published in 1812, Mr. Hanmer figured and described a species by the appellation of Red-backed Flounder, and stated it to be 'common in the spring upon the coast near Plymouth.' In the sixth volume of the Magazine of Natural History, p. 530, a specimen of *Solea variegata* is noticed by Dr. Scouler to have been taken at Rothsay in the isle of Bute. Mr. Jenyns, in his Manual of British Vertebrate Animals, p. 468, takes his description from one procured at Weymouth; and Mr. Yarrell, in his History of British Fishes, vol. ii. p. 262, figures and describes an individual supplied from Cornwall by Mr. Couch, and mentions, in addition, from the MS. of Montagu, that this naturalist received a specimen 9 inches in length from Dr. Leach, who purchased it with two others in Plymouth market, in August, 1808. Thus far our authors, with the exception of Mr. Jenyns (who leaves it to be proved by future investigation whether there be not a second species), speak only of one *Monochirus*.

"In the first volume of the Magazine of Zoology and Botany, p. 526, Dr. Parnell described a *Monochirus*, which is taken at Brixham, under the specific name of *minutus*, introducing it doubtfully as a new species, but with certainty as distinct from the 'red-backed sole, *Mon. Lingula*,' and, as such, an addition to the British Fauna. Lastly, the September number of the Annals contains observations by myself on two species of *Monochirus* taken on the coast of Ireland.

"To attempt placing the species, of which notices are here brought together, in a clearer light, is the object of the present communication; and although this may to a certain extent be done, the sequel will show that it cannot be performed effectively.

"*First*:—The variegated sole as figured and described by Donovan and Yarrell, the specimen recorded by Dr. Scouler,* and the individual noticed by myself under the name of *Solea variegata*, are identical. The localities in which this species has been procured, are the coasts of Cornwall in England, of the island of Bute in Scotland, and of Down in Ireland. As suggested in my previous paper on this subject, it may be worthy of investigation, whether the *Mon. Pegusa* of Risso, obtained from the Mediterranean, be this species (t. iii. p. 258, f. 33, ed. 1826).† Of the references in Mr. Yarrell's work, those relating to Rondeletius, Willughby and Cuvier apply, I conceive, to the species next to be noticed; Duhamel I have not for consultation; Fleming merely quotes Donovan and Pennant.

"Spec. char. *Mon. variegatus*. Pectoral fin about $\frac{1}{4}$ the length of head: scales on lateral line about 85; dorsal and anal unconnected with caudal fin.

"*Secondly*:—The *Solea Lingula* of Jenyns's Manual (excepting the short specific characters and colours which are copied from Hanmer), the *Mon. minutus* of Parnell, and the *Solea Lingula*, Rond. (*Mon. linguatulus*), described by me in the Annals, are the same species;—of the identity of these two last I judge

* As this fish is very briefly noticed in the Magazine, I wrote to Dr. Scouler respecting it, and was informed in reply that it may be considered identical with the variegated sole of Yarrell.

† The large size of the pectoral fin, as represented in the figure, marks a *Solea* rather than a *Monochirus*; but it is described as the latter by Risso, and the figure referred to as such by Cuvier, Règ. An., t. ii. p. 343, 2nd ed.

from a comparison of specimens. Being of opinion that Mr. Jenyns's description, so far as taken from the individual before him, related to this species; and that, rather than describe the colours from a specimen preserved in spirits, he had copied them from Hanmer's description of the red-backed flounder, believing it the same, though it is in reality a distinct species, I communicated with him on the subject, and his reply confirmed my views. The opportunity of examining specimens of this latter fish, which Mr. Jenyns had not, but through the kindness of Dr. Parnell I have had, could alone have settled this point, the describer of it having been silent on such characters as the length of the pectoral fins, and number of scales on the lateral line, by which chiefly it is distinguished from the present species.

"This is, I consider, the *Solea parva sive Lingula* described and figured by Rondeletius, and again repeated in the works of Gesner (lib. iv. p. 669), Aldrovandus (p. 237), and Willughby (p. 102, pl. F. 8, f. 1). With reference to this, the following note on three specimens obtained since the publication of my paper in the Annals may be here given. Of these, which are from 3 to 3¼ inches in length, one has the outline of *Solea vulgaris;* but the other two differ much from it in being narrower, and tapering more towards the tail, thus precisely resembling, even to the turn of the caudal fin, the *Solea parva sive Lingula* as represented by these authors: the lateral line too approximates the form given in the figure of this species, but in the specimens is placed rather higher on the body; in these it originates considerably above the middle, and for some way slopes gradually downwards, until it takes a course midway between the dorsal and ventral profile.* A figure of this fish illustrates Dr. Parnell's paper before referred to in the first volume of the Magazine of Zoology and Botany.

"The two localities in which this species has occurred in England are southern: at Weymouth in Dorsetshire, whence the single specimen was obtained that served for Mr. Jenyns's description; and at Brixham on the adjoining coast of Devonshire, where, Dr. Parnell informs us, it is taken in the trawl-nets throughout the year. In Ireland it has been procured with the trawl or dredge both in the North and South; in the month of August in the open sea off Dundrum, County of Down; in June and October within the entrance to Belfast Bay, and at Youghal in the County of Cork. (See Annals, *loc. cit.*) Of its occurrence in Scotland I have not seen any record. This is described to be a Mediterranean species.

"Spec. char. *Mon. linguatulus.*—Upper pectoral fin about one-seventh the length of head; scales on lateral line about 70; an occasional black ray throughout the dorsal and anal fins, this colour not spreading over the adjoining membrane.

"Thus far all seems clear, the British specimens recorded being allocated under the two species just treated of, with the exception of Hanmer's red-backed flounder obtained at Plymouth, and Montagu's specimen from the same locality. All that is wanted to fix the species of the first-mentioned is an examination of a moderate-sized *Mon. variegatus.* This Mr. Yarrell possesses; and now supplying him with the specimens by which I arrived at the above conclusions, I leave this point to be determined in the forthcoming Supplement to his History of British Fishes. As all the British *Monochiri* and *Soleæ* are taken on the southern coast of England, it signifies little to which of the species Montagu's specimen belonged.

"It may not be useless to mention some of the comparative differences between Hanmer's red-backed flounder (of which two specimens, procured by Dr. Parnell at Brixham,† are now before me), the *Mon. linguatulus* and *Mon. variega-*

* These specimens may further be described as of a reddish-brown colour, minutely freckled over with a darker shade, and having the roundish spots of dark brown and of white on the lateral line and on the body some way inwards from the base of the dorsal and anal fins, as had the individuals obtained in June last. See Annals, vol. ii. p. 21.

† It was between these or similar specimens that Dr. Parnell, calling them

lus. From the *M. linguatulus* it is at once seen to be specifically different, by the greater length of its pectoral fin (about $\frac{1}{4}$ that of head, whereas it is about one-seventh in the other), by its smaller scales (about 85 in the lateral line, the other having about 70), and by the conspicuous blotches of black, of which part is on the dorsal and anal fins, and part on the body of the specimens.* With *M. variegatus* the red-backed flounder accords in the length of pectoral fins, the number of scales on the lateral line, and in general form; in every character indeed, so far as I can judge from comparison with a specimen of *M. variegatus* under 3 inches in length, except in colour. This difference, in itself certainly not specific, is nevertheless very striking; my specimen of *M. variegatus*, $2\frac{3}{4}$ inches long, Mr. Yarrell's 5 inches, and Donovan's 9 inches in length, all presenting similar variegated markings. The colour of the upper side of Hanmer's fish is described to be 'a very light brown tinged with red,' and is figured of a uniform colour. Such Dr. Parnell's (preserved dry) likewise are, becoming darker at the margin, over which the black blotches on the dorsal and anal fins occasionally extend for a few lines; this marking, as represented in Hanmer's figure, is characteristic of that in the specimens at present under examination; but these exhibit rather more black on the dorsal fin. Hanmer's specimen was $6\frac{3}{4}$ inches long, Dr. Parnell's are $7\frac{1}{4}$ and $8\frac{3}{4}$ inches.

"The number of denticles and form of the scales of the *Monochiri* will not prove to be a positive character, though, relatively considered, they may be of service in the elucidation of species. On examining one of my specimens of *M. linguatulus* as to the number of these denticles, I found that a scale taken from the lateral line had 21; another from the next row had 22 and 2 rudimentary points; a third from an adjacent part of the body had likewise 22. The outline of these scales was different, the first being conspicuously contracted about the middle at one side, and straight throughout the other; the second slightly contracted about the middle on both sides, and the third with the sides quite straight. In each of two scales taken from the lateral line of Dr. Parnell's specimen of *M. minutus* there are 22 large strong denticles, with rudimentary points between them; outline of these scales different, and as in the individual just described. In my specimen of *M. variegatus*, two scales which touched upon the lateral line exhibited only 10 and 13 points; but this paucity may be owing to its diminutive size. A scale from the lateral line of Dr. Parnell's smaller specimen of the red-backed flounder exhibited 19 denticles, one off the third row from it 18. The form of scale in all the individuals examined is much the same, being broader for its length than that of scales I took from *Solea vulgaris;* they were generally, but not always, contracted about the middle, either at one or both sides. The scales were all examined *separately* under the microscope, and hence is a different result in the number of denticles from what would have appeared had they been reckoned on the body of the fish."—*Ann. Nat. Hist.* vol. ii. Feb. 1839.

The solenette has since been taken on the Dublin coast by Dr. R. Ball: Mr. M'Calla, in a letter written in 1840, mentioned his also having taken it off Dublin Bay, and on the Down coast.

In July, 1840, during an excursion to the western coast, in company with my friends Dr. Ball, Professor E. Forbes, and Mr. G. C. Hyndman, we dredged a few specimens off Bundoran.

THE VARIEGATED SOLE, *Solea variegata*, Flem., *Monochirus variegatus*, Thomp.,

Has been once obtained on the North-East coast. The specimen of this

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Mon. Lingula, clearly showed the characters in which they differed from his *Mon. minutus*.—See Mag. of Zool. and Bot. vol. i. p. 528.

* The black spots mentioned in my description of the colours of *Sol. Lingula*, Rond. (Annals, *loc. cit.*), differ entirely from these by appearing on the *body only;* they are small roundish spots, generally about a line in diameter.

fish, referred to in connexion with the solenette, [*ante*, p. 207, 208,] is the only Irish one which has come under my inspection.

The Cornish Sucker, or Ocellated Sucker, *Lepadogaster Cornubiensis*, Flem.,

Has been taken on the North-East and West coasts.

The following notes were published by me in the Proceedings of the Zoological Society for 1835 :—

"The only Irish specimen of this fish which I have seen was taken by Professor Harvey on the coast of Clare. The number of fin-rays in this specimen differs very much from that stated by Pennant and Donovan to exist in the ocellated sucker:

Pennant gives . . D. 11; A. 9; V. 4;
Donovan . . . D. 11; A. 10; P. 17; C. 6;
Dr. Harvey's specimen has D. 20; A. 11; V. 4; P. 19; C. 14; B. 6;

and exhibits, in addition to the two filaments which appear before each eye, a third fleshy appendage placed nearer to the eye, and unconnected with the others. Notwithstanding these discrepancies, the general accordance of Dr. Harvey's fish with the figures of the *Ocellated Sucker* given by the authors above-quoted, and its possessing the character whence the trivial name has been derived, make me unwilling, without further investigation, to consider the species distinct."

In the Ordnance Memoir of County Londonderry (Notices, p. 14), it is stated that

"several specimens were received in Oct., 1837, from Portrush (near the Giant's Causeway). Their colour was a rich blue, the spots behind the eyes being of a deeper tint."

At Lahinch, in the County of Clare, Professor E. Forbes and I obtained two specimens in July, 1840, between tide-marks. Early in August, 1845, several examples, all full grown or nearly so, were taken under stones between tide-marks, at Tory Island, off Donegal, by Mr. Hyndman.

The Bimaculated Sucker, *Lepadogaster bimaculatus*, Flem.,

Has been obtained on the North-East, East, and West of the island.

The following notice of this species was communicated by me to the Linnæan Society, in the Session 1834-5, and is referred to in the Proceedings of the Zool. Society, 1835, p. 82.

"*Cyclopterus bimaculatus*, Don., *Lepadogaster bimaculatus*, Flem.—The only localities in which I find it stated that the *Cyclopterus bimaculatus* has occurred being the more southern shores of England, I trust that, in connexion with what I have before had the honour of communicating to the Linnæan Society on the subject of the *Cyclopterus Montagui*, the following observations in proof of the former species having a more extensive geographical range than yet allotted to it, will be at least deemed worthy the brief space they occupy.

"When dredging near to Bangor, in the County of Down, on the 3rd Sept., 1834, accompanied by Mr. Hyndman, a specimen of *Cyclopterus* was brought up from a depth of 5 or 6 fathoms, which seemed to me *C. bimaculatus*. The spots from which this species derives its scientific as well as trivial English name, were, however, found to be wanting, though the specimens are of adult size; the tail to be rounded and not 'even at the end,' as that of the *C. bimaculatus* is described by Pennant and Montagu, and the pectoral fin to consist of about 18 instead of 11 rays, as attributed to it by Donovan and Fleming.

"All these differences, including the immaculate appearance, exist in the only other specimen I have obtained, which was taken in Strangford Lough, from a similar depth, during another dredging excursion in company with Mr. Hyndman, on the 11th of Oct. last.

"Notwithstanding the existence of these and some other points of minor difference between the specimens in question and the *C. bimaculatus*, as described, I conceive, from their agreement in other characters and in economy, that they are of one species.

"In length these specimens are respectively 1 inch 10 lines, and 1 inch 5 lines. The former has 5 rays in the dorsal, about 18 in the pectoral, 4 in the ventral, and about 12 in the caudal fins. The latter has a similar number in the dorsal, pectoral, and ventral, but the caudal presents at least 13, and the anal (owing possibly to its being injured) only 3.

"The prevailing colour of the larger fish is pale 'reddish orange,' that of the smaller dark reddish orange, in both specimens varied with round spots and irregular markings of white; the latter also exhibits large blotches of pale vermillion along its back. In both, the belly and organ of adhesion are yellowish.

"These specimens agreed with Montagu's observations on the *C. bimaculatus* by 'instantly attaching themselves to the hand when taken out of the water,' and by 'preserving their beautiful pink colour in spirits,' or I should rather say simply of preserving their colour, as, although differing in this respect, they have retained their original brightness unimpaired.

"Besides the above differences, there is not any other observable between these fishes and the descriptions and figures of the *C. bimaculatus* in the works quoted that seems to demand attention."

I was pleased to find, on the subsequent publication of Mr. Templeton's Catalogue, that this species was known to him. He notes "two specimens found in a dredge, August, 1811." By subsequent deep dredging in Belfast Bay and Strangford Lough, specimens have been obtained. On one occasion I took upwards of a dozen specimens of this fish at the former locality, on some of which the spots were wanting. The species is noted in the Ord. Surv. as "from Larne."

Mr. Hyndman, when dredging (20th June, 1844) off St. John's Point, County of Down, brought up from a depth of fifteen fathoms, a perfect and full-grown specimen of the bivalve shell, *Venus virginea*, in which were a *L. bimaculatus*, with its ova and young, some only of which had made their appearance; and the same gentleman, at the end of August in the same year, dredged in Belfast Bay a single full-grown valve of *Pectunculus pilosus*, the hollow of which was close studded over for the space of a square inch with the ova of this species, each ovum touching or close to the next one. These ova are deposited singly over the surface of the shell on which every one rests, each ovum globular, about 1-16th of an inch in diameter, which is remarkably large for a species which I have not known to exceed 2 inches in length.

I had frequently seen this species when brought up in the dredge within old single valves of bivalve shells, but until the instances just mentioned occurred I was not aware of the cause of its partiality to them.

March 30, 1846. A specimen about 2 inches long was brought to me alive in Belfast market, having been found among Killinchy oysters (probably taken from the water twenty-four hours before). The whole upper surface of the living fish was of a dark purplish brown colour, with minute yellow spots disposed over it: the under surface was whitish flesh colour, but pinkish with darker spots of red in the hollow portion towards sucker.

Eye proper dark blue with brilliant orange irides.

April, 1846. After being in spirits for some little time, this specimen is of the usual red colour on the upper surface.

In 1839, I saw in Dr. Ball's collection a specimen dredged by him off

the Dublin coast; and in July, 1840, when on excursion with him and others to the West of Ireland, this species was dredged in Roundstone Bay, on the Galway coast.

In *Nov.*, 1842, I obtained a fine specimen within an oyster, dredged in L. Ryan, *Scotland*, and brought to Belfast market.

I have not seen any notice of this species having been obtained on the coast of Scotland.

THE CONNEMARA SUCKER, *Lepadogaster cephalus*, Thompson,

Has been once taken on the western coast, as mentioned in the following communication which I published in the Annals Nat. Hist., vol. iii. p. 34:—

"LEPADOGASTER CEPHALUS, *mihi*, Connemara Sucker.

"In the collection of Dr. Ball of Dublin there is an apparently undescribed species of *Lepadogaster* which was taken in Roundstone Bay, Connemara, on the western coast of Ireland. From the two British species already known, *L. bimaculatus* and *L. Cornubiensis*, this fish is very different. It cannot be that alluded to in his paper on the Fishes of Cornwall, by Mr. Couch (Linn. Trans. vol. xiv. p. 88), as allied to the latter, nor can it be mistaken by any ichthyologist for the *L. Cornubiensis*, which has been described so differently by authors as to have led Mr. Jenyns to remark in reference to it that 'possibly we may have two species in our seas, which have been hitherto confounded.' Man. Brit. Vert. An., p. 470. A critical comparison shows that the fish under consideration agrees not with any of the eleven or twelve? (see p. 274) species described by Risso as inhabiting the Mediterranean,* Hist. Nat. l'Eur. Mer. t. iii. p. 271—of these, the *L. biciliatus* is considered by Mr. Yarrell to be the same as the *L. Cornubiensis*. Although in the depressed form of the head this fish resembles more the minute species *L. bimaculatus* than the *L. Cornubiensis*, yet its equalling the latter in size, and having with it the dorsal and anal fins occupying a considerable portion of its length, renders it only necessary to be compared with this species. In general form it differs much from *L. Cornubiensis*;† though narrower in the snout it is of greater breadth across the posterior part of the head; it is also much more depressed in the anterior half, and narrows suddenly behind the ventral disk, being to the tail compressed and tapering—in *L. Cornubiensis* the body slopes gradually from the head posteriorly.

"DESC. Length, $2\frac{1}{2}$ inches; skin smooth; fin-rays in number, D. 15; A. 10; P. 25 and 4; C. 15 (conspicuous, or 20 in all)=Br. 5. Head very broad posteriorly, thence to the snout (which is truncated and $1\frac{1}{2}$ line across)‡ sub-conical, occupying rather more than $\frac{1}{3}$ of the entire length; from this part to a little beyond the portion of the body above the termination of the ventral disk likewise sub-conical; thence to the tail rather compressed and tapering; in advance of each eye and on a line with its upper margin an extremely minute cirrus, hardly visible without a lens; eyes large, lateral, the space between them twice their

* This genus is either limited in geographical distribution, or there is much yet to be learned respecting it. In the general work of Bloch there is not a single species included; in the Prodromus Ichthyologiæ Scandinavicæ of Nilsson, published in 1832, there are none; and in the Fauna Boreali-Americana it is remarked that none of the genus has yet been detected in America.

Since this article was sent forward for publication I have seen Mr. Lowe's Synopsis of the Fishes of Madeira, just published in the Transactions of the Zoological Society of London (vol. ii. part 3). Here I find a species of *Lepadogaster* described, but with much doubt, as the *L. Candollii* of Risso.—The few characters of the Madeira fish given by Mr. Lowe accord with those of *L. cephalus*; but without a more detailed description of it, any opinion as to the identity of the species must be premature.

† The comparison is drawn up between the *L. cephalus* and an individual of *L. Cornubiensis* of similar size.

‡ $2\frac{1}{4}$ lines in the specimen of *L. Cornubiensis*.

diameter, distant from snout 1½ of their diameters, occupying ⅓ the length of head; gape wide, the lower jaw rather the shorter; teeth pointed and very numerous in both jaws, the outer ones of the upper jaw the largest; gill opening small; pectoral fins placed just behind it, and 'extending downwards to the lower surface of the body, where the rays [4 in number] become suddenly stronger, and the membrane doubling forwards passes on to unite with that of the opposite fin under the throat; the membranes of the pectorals thus united enclose a disk, and form a [slight] hemispherical cavity . . . . . [but smaller and of different structure from that of *L. Cornubiensis*] formed by the united ventrals:' dorsal fin originating behind the middle of the entire length, and continued to near the caudal fin, with which it is unconnected; anal fin commencing nearer the caudal, from which it is separate; last ray of dorsal and anal fins when laid close to the body reaching to the base of the outer rays of caudal fin, their posterior rays about equal in length to the depth of the body at their base; caudal fin occupying about ⅓ of the entire length, central rays longest; rays of all the fins articulated but not branched; vent situated midway between the posterior part of ventral disk and the extremity of caudal fin: a short anal tubercle as in the genus *Gobius*—this the *L. Cornubiensis* and *L. bimaculatus* also possess.

"*Colour* (in spirits)—entire upper surface, sides of head and body, of an uniform dull flesh-colour (having been probably crimson when recent), pectoral fins and under surface of a paler hue; dorsal, anal, and caudal fins pale carmine at the base, changing gradually to deep carmine at the extremities.

"Spec. char. A single very minute cirrus before each eye; dorsal and anal fins unconnected with the caudal; ventral disk small.

"When noticing the *Lepadogaster Cornubiensis* as an Irish species before the Zoological Society of London, in June, 1835 (Proceedings Z. S., p. 81), I called attention to the very great discrepancy in the number of fin-rays in the specimen then exhibited, compared with that attributed to the species by the British authors who had to that period described it; stating at the same time that I could not but consider the Irish specimen the *L. Cornubiensis*. The individuals who furnished the descriptions to the works of Mr. Jenyns and Mr. Yarrell since published have accorded with mine, and the view taken by these authors respecting the synonyma is similar.

"Dr. Fleming in describing the *L. Cornubiensis* (Brit. Anim. p. 189) remarks, that it 'differs from the *L. Gouani* and *L. Balbis* of Risso;' and adds, 'the former of these, figured by Gouan, Ich. p. 177, gen. xxxiv. t. 1, f. 6, 7, differs in the spots behind the eyes being crescent-shaped, and the dorsal fin having a greater number of rays.' Here there is some confusion—what is stated in reference to the spots in Gouan's figure is correct, but not so the number of fin-rays, as in the figure of the upper side of the fish 11 rays—the number Dr. Fleming attributes to the *L. Cornubiensis*—are represented in the dorsal fin; in the engraving of the under side 10 rays only appear in this same fin; in the anal fin likewise one ray less is given in the view of the under side than in that of the upper (9): it thus seems as if the precise number of rays was not intended to be represented. Besides the form of the markings behind the eyes being different in Gouan's figure from those of the *L. Cornubiensis* as mentioned in the extract above quoted, the separation of the dorsal and anal from the caudal fin (supposing the engraving to be correct) at once shows his to be distinct from this species. Risso, referring to Gouan's figure as an illustration of the *Lepadogaster* that he has named *L. Gouani*, gives 16 as the number of rays in the dorsal fin." *

The Lump Sucker, or Lump Fish, *Cyclopterus Lumpus*, Linn.,

Is taken around the coast.

This fish is chiefly known from adult specimens, which, in the spring of the year—March till May—resort to the shores to spawn, when they

* Hist. Nat. l'Eur. Merid. t. iii. p. 271. There is a typographical error here; Gouan, i. 67, being quoted instead of [t.] i. [fig.] 6 and 7.

are taken (seldom on the N. E. coast more than one or two at a time) in the nets set for various fish.

It is not eaten here: the female greatly exceeds the male in size.

In the Annals Nat. Hist. vol. iii. (p. 43), I published the following notes on this species.

"Cyclopterus coronatus, Couch. Coronated Lump-fish. Cornish Fauna, p. 47; Annals Nat. Hist. vol. ii. p. 382.—Of this fish, considered by Mr. Couch distinct from the *C. lumpus*, I procured two specimens, rather exceeding 10 lines in length, by dredging in Strangford Lough on the 1st of Oct.; the particular date is mentioned in reference to the question whether the *C. coronatus* may not be the young of *C. lumpus*. Without offering any opinion on this point, it seems to me proper to notice the capture of this minute fish elsewhere than on the coast of Cornwall, where one individual only has been observed." *Ann. Nat. History*, vol. v.

"When dredging in Strangford Lough, County Down, on the 2nd of July last, and whilst engaged in capturing specimens of *Couchia minor* (see Annals for February) on the surface of the sea, the dredge * brought to light two individuals of the *Gobius minutus* of the Zoologia Danica. In classification these belong to the genus *Cyclopterus* as now restricted, and in the Prodromus Ichthyologiæ Scandinavicæ of Nilsson (p. 61) are brought under this genus, the specific name of *minutus* being retained.

"Desc. These specimens are each half an inch long,—the greatest length attributed to the species in Zool. Dan. is 2 inches,—and when viewed from above, like the young of *C. lumpus*, are much of a tadpole form, or about one half of the entire length somewhat globose, thence to the caudal fin much compressed: first dorsal fin lobiform as in that species, second dorsal originating just behind it, and extending to near the caudal fin: anal commencing at some little distance from the vent, and ending on the same plane with the second dorsal—the number of rays in the above fins could not be accurately estimated; pectorals about 16 rays, large, 'uniting under the throat and enclosing the disk of the ventrals,' as in *C. lumpus*; disk likewise similar (as it also is to that of *Liparis Montagui*), with five lines diverging from the central one; caudal fin square at the end, rays from 8 to 10; vent at about the middle of the entire length; no spines anywhere visible.

"*Colour* (when recent).—One individual has the body of a very pale dull yellow, and under the lens appears closely studded with extremely minute black points; besides these it exhibits at intervals all over the body conspicuous round spots of a reddish rust-colour; a blue line extends from each eye to the extremity of the mouth just beneath; first dorsal fin dusky or blackish, other fins pale-coloured; a blackish band across the tail, at the base of the caudal fin.

"Of the second specimen the general hue is slightly reddish, and consequently the rust-coloured spots are less conspicuous; they are likewise fewer in number; tail dusky and not exhibiting the band like the first described; in other respects similar; no dull ferruginous striæ apparent on dorsal or caudal fins of either specimen are described in the Zool. Dan.†

"Having since the autumn of 1836 possessed very small specimens of a *Cyclopterus* a few lines longer than those just described, and which I was disposed to consider the *Cycl. minutus* of authors, I compared them with those of the *Gob. minutus*, when the difference seemed consequent on variety of colour and

* They were taken in a sheltered bay in which the water was about 25 fathoms in depth; but although brought up in the dredge, they might have been captured anywhere between the bottom and the surface of the water,—the warmth and calmness of the day was such that it might have attracted them thither.

† The specific characters here given are 'Gobius albicans, ferrugineo-maculatus, radiis dorsalibus, et caudalibus ferrugineo obsolete striatis."

on age only. Those looked upon as *Cycl. minutus*, again compared with undoubted specimens of *Cycl. lumpus* a very little larger, were evidently this species in a younger state. To understand this some detail is requisite.

"*First.*—With reference to the identity of *Gob. minutus* and *Cycl. minutus*, Pallas,* it may be observed that the two specimens of the former have what may be termed three tubercles on the snout (a character attributed to *Cycl. minutus*, Pall., and apparent on the specimens believed to be of this species now before me),† from the bone (?) advancing forward so as to form two points above the upper lip, and central between them, but placed higher up is a third prominence. With the following exceptions they have all the characters of any value in common. The tubercles which appear on the side of the others are wanting in *Gob. minutus*, but a series of specimens of *C. lumpus* I have examined sufficiently prove that these are only acquired by individuals of a larger size; and their absence is consequently attributed in the present instance to the extreme youth of the individuals. The reddish spots of *Gob. minutus* would seem merely to indicate a *variety;* an opinion which is strengthened by the difference the two individuals present in this respect, one displaying very few and the other numerous spots, and further, by these markings, so conspicuous in the recent state (having been quite as much so in one of my specimens as represented in Zool. Dan.), becoming very obscure after the fish has been a short time preserved in spirits. Between these and equally small ordinary specimens of *C. lumpus* I perceive no difference but in the spotting. The *Gob. minutus*, which is not described as possessing spines or tubercles, is stated to attain 2 inches in length,‡ a size much larger than any specimens I have seen without tubercles; but as the *C. lumpus* differs much with respect to the time these originate, this circumstance does not, I conceive, affect the question of their identity.

"*Secondly.*—With reference to specimens intermediate in size between the *Gob. minutus* and *C. lumpus* being the *Cycl. minutus*, it may be remarked, that the only character of this species given in Turton's edition of the Systema Naturæ, that seems specifically different, is, 'in the place of the first dorsal fin is a tapering reclined long spine'§ (vol. i. p. 905): in my specimens, the fleshy appendage which takes the place of the first dorsal fin has to the eye a rigid appearance, but is in reality soft, and may from that circumstance have led to what has just been quoted being adopted as a character. With Pallas's description of *Cycl. minutus* my specimens generally accord: this author does not, like Turton, speak of a dorsal spine, but of a spurious dorsal fin,—an expression most applicable to those before me; this spurious fin is comparatively longer in small than in large individuals. One of my specimens, 10 lines in length, conspicuously presents three tubercles on the centre of the body, where *Cycl. minutus* is stated to have two ('in mediis lateribus, supra pinnas pectorales proxime ad sinum branchialem tubercula duo ossea,' &c., Pallas), but at the same time

* I have not had the Spicilegia Zoologica to consult, but judge from the description and sketches of the figures most kindly copied from the work for me by Mr. Yarrell. Cuvier, in the Règne Animal, tom. ii. p. 346 (note), considers the *Gob. minutus*, Zool. Dan., and *Cycl. minutus*, Pall., as distinct. It is the latter, without any allusion to the *Gob. minutus*, that is enumerated among the fishes given in the Appendix to Ross's second Voyage. Since this note was so far written, I have had the opportunity of meeting Sir James C. Ross, the author of that portion of the work, who informed me that he was of opinion that the *Gob. minutus*, Z. D., and *Cycl. minutus*, Pall., constituted two species—of the former he judged from the description, accordant with which specimens had not been obtained during his northern voyages.

† Some individuals are so plump as not to exhibit these points.

‡ The figures given as of adult specimens in Zool. Dan. very little exceed one inch.

§ This may be adopted from Gmelin, whom I see quoted for the species, which was not described by Linnæus himself. Turton's description seems to refer to Pallas's fish.

on close inspection has a few spines beginning to appear on the ridge of the back and on each side of the belly, as in *C. lumpus;* but these are not more than ½ the size of those on the middle of the body—the spines on this row (the central one) are much larger than those forming the other rows in a fully armed specimen of *C. lumpus* (as to the rows of tubercles) an inch in length. The fact of these tubercles first making their appearance on this line and beginning to do so near the head, may explain why these only should be described in examples of a certain size.

"Mr. Couch mentions, with some doubt as to its species, a small *Cyclopterus* taken on the coast of Cornwall. He states that 'it is rarely found longer than an inch, and differs from the *C. lumpus* in the skin between the [rows of] tubercles being quite smooth.' Linn. Trans. vol. xiv. p. 87. Sir James C. Ross is disposed to consider it the *Cycl. minutus*, Pall. (App. Ross, 2nd Voy. p. xlvi.), which I am inclined to do in so far as an incidental description will warrant such a conclusion; and at the same time, with the single difference pointed out between it and *C. lumpus*, I should consider it this species, as in the very young state tubercles such as cover over the skin of the adult fish are not apparent.

"The specimens otherwise agreeing with the description of *Cycl. minutus*, after having been preserved in spirits for two years, are of an uniform pale dusky tinge; the ground or general colour is light, but, being densely dotted over with extremely minute black points (visible under a lens), these give the appearance described. As before stated, both specimens of *Gob. minutus*, Mull., have likewise these very minute dots, though much more sparingly; but in addition to them exhibit the larger reddish spots; another individual similar to these in size is of a light colour, blotched with dusky markings. Instead of the spotting on the body, which forms the most prominent character of the *Gob. minutus*, the *Cycl. minutus* is described by Pallas and Turton to be whitish.

"The specimens of *Gob. minutus*, *Cycl. minutus*, and the smallest *C. lumpus* of adult form, and possessing all the rows of tubercles, have a straight dark line (which in the recent examples of *Gob. minutus* was of a blue colour) extending from each eye to the corner of the mouth just beneath; this does not, however, bespeak identity of species, as in the *Liparis Montagui* I have observed the same marking. All of these specimens but the last are comparatively more elongate in form than the mature *C. lumpus*. A similar remark has been made by Montagu respecting the *Lepadogaster bimaculatus*, the fry of which he states are proportionably longer in the body than the adults.—*Wern. Mem.* i. 92.

"*Thirdly.*—As favouring the opinion of the identity of *Cycl. minutus*, Pall., and *C. lumpus*, it may be remarked with respect to the three tubercles on the snout, attributed to the former species, that they are likewise possessed by specimens of the *C. lumpus* of the extremes of size examined, one an inch long (as to the rows of tubercles a well-marked *C. lumpus*), and another 18 inches in length, equally displaying them.

"In the form of the spines or tubercles, a very interesting change takes place, analogous to that in the *Trigla Cuculus* and *T. Gurnardus* (see Annals for February), but to a much less extent, and requiring a much shorter time to be perfected. The armature first appears in a spinous form, thus —in the specimen an inch long, thus , or like a shark's tooth; and in the individual 18 inches long, thus —in the adult fish only one slightly projecting central point is generally present; of all the large tubercles on the body of the last-mentioned specimen two only exhibit more than one point: the 'spurious dorsal fin' in this fish is a series of compressed tubercles.

"The *C. Lumpus* occurs in all the localities in which the *Gob. minutus* and *Cycl. minutus* are stated to have been found. The first of the two latter is mentioned by Muller and Nilsson merely as taken on the shores of Norway; the

latter, by Pallas and Sir James C. Ross, to have been obtained among floating masses of sea-weed in the Atlantic Ocean.

"I have had the opportunity of examining specimens of *C. Lumpus* (as all are considered to be) taken from the northern to the southern coast of Ireland. Of the individuals particularized in this article, those answering to the *Cycl. minutus*, Pall., were taken at the surface of the sea about Larne (in September, 1836) and Drumnasole (in August, 1837), in the County of Antrim, by Mrs. Patterson of Belfast, who favoured me with them. In the month of July, a few years ago, Mr. Hyndman (Memb. Nat. Hist. Soc. of Belfast) took in Larne Lough several minute specimens of a *Cyclopterus* under an inch in length, and which, like the *Cycl. minutus* of Pallas, were among masses of sea-weed floating on the surface of the water; but the specimens having unfortunately been lost before they reached me, nothing further can be said of them. Those agreeing with the *Gob. minutus* were, as before-mentioned, captured in Strangford Lough,* County Down. In Kingstown harbour, near Dublin, an individual nearly as minute as any here described was taken by Dr. R. Ball and myself, in August, 1836, by dredging. A rare fish mentioned by a correspondent as occasionally taken at Wexford, and of which a figure was communicated to me, proved to be this species; and at Youghal examples 18 inches in length have been procured by Dr. Ball—of a similar size is one from the northern coast preserved in the Belfast Museum.

"The following notes from my journal on the mature *Cyclopterus Lumpus* may not be unacceptable.

"*March 26th*, 1835.—A large lump fish, taken near Carrickfergus, was brought to me yesterday morning; but, not being purchased, was as a curiosity hawked about the streets of Belfast throughout the day, and by several persons my attention was directed to it as an extraordinary production; its semi-transparent dull grey colour, much diversified, or apparently begrimed with black, certainly gave it somewhat of a hideous aspect. No purchaser being found here, it was taken this morning to the town of Lisburn, about seven miles distant, and was displayed as on the preceding day, but with more success, as it was there disposed of. This I learned in the afternoon, by the taxidermist to whom it was sent, calling to show it to me as a strange fish just received from the *inland* town of Lisburn, a locality considered to enhance its rarity.

"*April 8th*, 1836.—To the middle of April, 1835, when I left home, but the one lump fish had been brought to Belfast market, and the first for the present season was brought hither to-day. It was taken in the bay along with mullet (*Mugil Chelo*), and was alive when I saw it, although several hours out of the water. As in the specimen of last year, no bright colours were displayed, the general hue being blackish, intermixed with dirty white; the under surface of the latter colour; on close examination a little dull red was visible at the extreme tips of the caudal fin, and the pectorals presented an extremely faint orange tinge. On dissection it proved to be a female, and contained a vast quantity of ova, of a delicate rose colour. The ova alone weighed 25 oz.; of this I had a drachm weighed and carefully reckoned the number of ova, each nearly a line in diameter, that it contained, and found the whole mass, if considered accordingly, would consist of the amazing number of 101,935 ova—the produce of a fish about 15 inches in length. With such prolific powers we can readily imagine that this species should abound, as it is reported to do, in the northern seas, its chief abode. The stomach did not contain any food.

"On the 13th of this month another female specimen, of similar size and colour

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* The *C. Lumpus* has been described to me as entering this "lough," or arm of the sea, in spring,—the period of depositing its ova.

At the island of Lambay, off the County of Dublin, I, early in the month of June last, captured a *Cyclopterus* which was equally minute with those obtained in Strangford Lough, but of a dark colour—it did not possess any tubercles.

and taken in the bay, was brought to me. On the 20th of this same month two more were, like that of the 8th, captured in the mullet-nets at Garmoyle, a deep part of the bay, about three miles from town. One of these, in size and of a blackish colour like those hitherto noticed, proved to be a female; but the other, a much smaller specimen, was of a beautiful deep rose colour on the lower half of the body, this hue prevailing to a greater extent than the orange represented in Donovan's figure of the species; this was a male fish.

"Cuvier remarks, 'Le *Cycl. gibbosus*, Will., vol. x. f. 2, ne paraît qu'un Lump male empaillé' (Règ. An. tom. ii. 346, 2 ed.), the correctness of which seems to admit not of doubt. It may be added, that Willughby copied his figure from Gesner (lib. 4, paralipomena, p. 29). The hump appears to me to have been a manufacture of the preserver's, probably to add to the effect of the uncouth aspect which the fish at best presents, a conjecture which I venture to make on account of the stretched appearance which the skin presents throughout this dorsal pyramid (hence the appellation of *pyramidatus* bestowed on it in Shaw's General Zoology, vol. v. part 2, p. 360, pl. 167) in the figure of Gesner, and which is repeated in the works of Willughby and Shaw. Opposed to this view, however (which might suffice were one specimen only recorded), is the circumstance, that the *C. gibbosus* is stated to have occurred in the Baltic Sea, Northern Ocean, and (according to Sibbald) on the coast of Scotland."—*Ann. Nat. Hist.* vol. iii.

April 7th, 1840. A female lump fish was found adhering to a stone under the wheel of the bridge at "the paper mill," Belfast, the extreme point to which the tide flows at high water. The fish was dead when discovered, and full of roe.

March 8th, 1841. The largest *Cyclop. lumpus* I have seen was sent from Portaferry to-day, for the Belfast Museum. It is 23½ inches long, is a female, with ova protruding, and has no red markings but the usual begrimed appearance of this sex.

June 22nd, 1844. Mr. Hyndman to-day took a number of the young of this species, from ¾ inch to 1 inch long, but none exceeding an inch in length, but floating on the surface in the Kyles of Bute: a fortnight afterwards he saw them similarly floating on the surface of the sea, at the Skerries on the Dublin coast: they rested by attaching themselves to floating sea-weeds.

Cyclopterus lumpus, young. *Aug. 25th*, 1846. Mr. R. Patterson brought me this morning three specimens alive, from Cultra, taken on the 22nd, about an inch in length: two of them are to the naked eye of a uniform bright green colour (but differing in shade), without spots; the third is of a pale green covered over with large rust-coloured spots, like the *C. minutus*, Zool. Don. pl. 154. Their fins are all of a beautiful hyaline transparency, and when the fish moves quickly are consequently invisible: a bluish line tinged with gold extends from each eye to the mouth and as far behind the eye in a straight line; pupil blackish, irides reddish golden.

These specimens confirm the view which I took in a paper, published in the Annals, vol. iii. p. 38. In place of the dorsal lump in the adult fish, they have a fleshy membrane of the same colour as the body, which serves as a fin in all their motions; three or four points like those of rays project a little from its margin, are brownish, under parts of the fish are greenish-white, pectoral fins orange tipped with dusky.

Mr. Yarrell says: *

"Some of our fishermen consider that we have on our coast two species of lump fish, which they distinguish by the names of Red Lump and Blue

* Br. Fishes, vol. ii. p. 366.

Lump, considering the first only as eatable; but the difference in colour, and also in the quality of the flesh, is only the effect of season, the fine external colour, as well as the firmness of the flesh, being lost to the fish for a time by the exhausting process of spawning; it is then by them considered as the worthless blue lump."

My observations lead to a different conclusion, viz. that the *red lump* is the male, and the *blue lump* the female.

Scotland. From Ballantrae, Ayrshire, an adult specimen was once sent me in spring, and in August, 1839, I saw, when there, two specimens which had been taken in the *salmon* nets.

THE UNCTUOUS SUCKER, OR SEA-SNAIL, *Liparis vulgaris*, Flem.,

Is noticed in the Ord. Survey Memoir (p. 14, Notices) simply as obtained at "Lough Foyle and Larne." On looking critically, however, to eight specimens so named in the Ord. collection, and labelled "Larne, 1849," I considered them all to be Montagu's sucking-fish, *L. Montagui*.

Mr. *M'Calla* wrote to me of his having procured *L. vulgaris* at Roundstone, a specimen of which Dr. Ball had purchased from him; but on looking to this I found it also to be *L. Montagui*.

It would be desirable if the other specimens alluded to from these different quarters were closely examined; but until this be done, and *L. vulgaris* be positively found among them, or be obtained elsewhere, it had better be omitted from our Catalogue.

MONTAGU'S SUCKING-FISH, OR THE DIMINUTIVE SUCKER, *Liparis Montagui*, Flem.,

Has been taken on every side of the island.

The following abstract of a paper read by me before the Linnæan Society, on 6th May, 1834, appeared in the Phil. Mag., vol. v. p. 300:—

"The *Cyclopterus Montagui*, Donov., which stands recorded as having been taken only on the southern coast of England, and there but by its discoverer, was next introduced from the circumstance of a specimen occurring to the author on the coast of the County of Down in Dec., 1833.

"The difference consisting chiefly in colour and markings between this fish, which was mature, and Colonel Montagu's as described in the Wern. Mem. (vol. i. p. 92), was pointed out."

I subsequently ascertained that Mr. Templeton had "found an individual adhering to a plant of *Fucus serratus* on the shore of Carrickfergus Bay, about two miles below the castle, on the 1st of April, 1807," although he had not determined the species. (See his Catalogue.)

Since the publication of the above abstract, several specimens have been procured on the N. E. coast, and I have seen in Dr. Ball's collection examples from Tramore (County of Waterford) and Youghal; also one from Roundstone Bay, County Galway. (See the preceding notes on *Liparis vulgaris*.)

In April, 1837 and 1838, specimens were kindly sent to me from Portpatrick by Captain Fayrer, R. N. In one instance four individuals were taken at the same time adhering to sea-weed (*Fuci*), after it had been thrown ashore for manure. The largest of these was 3¼ inches long. Dr. Johnston has met with this species on the coast of Berwickshire.

THE COMMON REMORA, *Echeneis Remora*, Linn.,

Has been once obtained on the Irish coast, as mentioned in the following notice, which I contributed to the Ann. Nat. Hist. vol. xviii. p. 314:—

"Remora, *Echeneis Remora*.—A letter from Dr. R. Ball, dated Dublin, July 29, 1848, informed me that Mr. N. A. Nicholson had that morning brought him a fresh specimen of this fish, which he found adhering to the gills of a large shark, which, with the aid of a fisherman, he captured at Clontarf, Dublin Bay, on the preceding night: it was observed in shallow water and driven ashore. A second *Remora* was adherent to the gills at the opposite side, but when disturbed, as is stated, it made its way inwards by the branchial orifices, and was not seen again. Dr. Ball afterwards obtained the fish on which the Remora was found; it was a blue shark (*Carcharias glaucus*) of a beautifully blue colour, and 10 feet 1 inch in length."—*Ann. Nat. Hist.* vol. xviii.

The second specimen of Remora was not discovered.—*R. B.*

DIV. III.—MALACOPTERYGII APODES.

THE SHARP-NOSED EEL, *Anguilla acutirostris*, Yarrell,

Is abundant in the waters of Ireland and around the coast.

In the North of Ireland this species is principally taken at Toome and at Portna, on the lower Bann, a river which connects Lough Neagh with the sea. They may, according to law, be taken from the 1st of June until the 1st of March, but there is no fishing of any importance until about the 1st of August. The greatest number taken this season * at Toome in one night was 10,000; the greatest which I have heard of, as taken in one night, was 70,000. They are sold at the fishery at 2*d.* per lb.: any trout taken with them are sold at the same price. The tank into which the eels are thrown when caught, will hold 8000; their value is about £40.

"They are taken in nets which may be compared to sugar-loaves with the tops cut off, each from fourteen to sixteen yards long, and placed between weirs. At an early period of the summer it is an interesting sight (at the Cutts near Coleraine, on the lower Bann) to mark the thousands of young eels there ascending the stream. Hay-ropes are suspended over the rocky parts to aid them in overcoming such obstructions. At these places the river is black with the multitudes of young eels, about three or four inches long, all acting under that mysterious impulse that prompts them to push their course onwards to the lake."†

Two men at the locality mentioned are paid £5 each for assisting the fish in their progress, by placing the hay-ropes up which they climb. In frosty weather the eels like to "harbour" about these ropes; the eels are then caught in baskets, and lifted up the rock. What fishermen term a run of eels does not take place in the day-time, or on a moonlight night, but when the night is dark. A correspondent ‡ mentions that he has completely stopped their progress by placing three large lamps, so that the rays of light fell on the surface of the water: thunder prevents their "running" when all else is apparently favourable. The direction of the wind is also of importance; it is favourable when with them, or from any

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* No date in MS.—ED.

† Patterson's Zoology for Schools.

‡ The name is not attached to the note, nor do we recognise the hand-writing.—ED.

point of South; but if a sudden change occurs they will cease to migrate for the night. I saw the largest eel taken that had been caught for ten years; it was 3 feet 7 inches long, and weighed 7½ lbs. On the night of the 24th September, when I was present, 3000 eels were taken in the first net, and 1500 on the same night in the next three, which are in juxtaposition.

The young eels seem in some places to form an article of food.* Dr. Ball states that they are eaten boiled in milk, or pressed into a sort of cheese. I was told, in Oct., 1839, by R. Barklie, Esq., that he had seen a water-spaniel go for two or three days to the base of the Fall at Ballyshannon, at low water, and feed greedily on the young eels waiting there to ascend the rock. The same gentleman informed me that a dog belonging to Dr. Casement of Larne went out regularly to Larne Lough to fish, and when he set his foot on a fluke would lay hold of it. He also caught fish otherwise than by "tramping," as this is called, a practice which Mr. B. thinks the dog had acquired by going out with boys intent on that object.

Mr. Bernard Meenan informs me that he has sometimes got a ton weight taken in one night, from different weirs on the river Lagan: he considers them even better than the Toome eels, and those taken in the bay as good. So many as 10 stones weight have been taken in Belfast Bay during a day's fishing by one person, who used baskets resembling lobster pots, baited with small fish, and pulled them up frequently.

Eels are caught in the river flowing through Galway by garbage thrown into it, round which they congregate. The water being clear, they are seen, and caught simply by a hook fastened to the end of a long rod, as we witnessed, 1834.

This species has been sent alive for the last few years to London. The young eels only are known to ascend the Bann.

The following communication was published by me in Annals of Nat. Hist. vol. vii. p. 75:—

"*Eels killed by frost.*—Although it is well known to naturalists that the eel, otherwise tenacious of life, cannot bear excessive cold, I conceive that the following facts upon the subject, though by no means so satisfactory as could be wished, are worthy of being placed on record. On the 6th, 7th, and 8th of the present month (February, 1841), great quantities of this fish, in a dead state, floated down the river Lagan to the quays at Belfast. Here, upon these days, and along the course of the river within the tide-way, collecting dead eels was quite an occupation at low water, and to the numerous loiterers about the quays proved in some cases more productive for the time than the 'chance jobs' by which they gain their livelihood. One individual earned his two shillings for nearly a bushel-full,† and another, selling them at the same rate, gained five shillings for what he collected at the fall of a tide. Three examples sent me by my friend Edmund Getty, Esq., were the common eel (*Anguilla acutirostris*, Yarr.), in excellent condition, and in all respects of ordinary appearance; one was about a foot, the others were two feet, in length. They were found dead of all sizes up to the largest.

"The only experiment I heard of being made on these eels was that four of them, of gradations in size from a foot to two feet in length, were placed in water warmed to a high summer temperature, to see if they would revive; but, as may be anticipated of such a proceeding, none of them exhibited any signs of life. A highly interesting fact connected with this fatality among the eels is,

* Ball's Lecture; also Boule's Nat. Hist. p. 191.

† The price of eels in our market is three-pence or four-pence per pound.

that on the three days on which they perished from the cold the thermometer was nearly ten degrees higher than it had been for three days successively in the preceding month, when none were known to have suffered from it. At that time the wind was South-West and moderate. When they were killed there was a gale from the East, accompanied by hard frost: to the human body the cold was at this time extreme and piercing, though at the period mentioned, in January, it was not disagreeable. At low water a great extent of mud-banks is uncovered at the part of the river where the eels were killed, and at this season these fishes are believed to be imbedded in the mud; they would seem to have suffered from the intense cold arising from the rapid evaporation produced by the piercing East wind.

"Since January, 1814, such a sensation of extreme cold has not been experienced at Belfast, and at that time, as I am informed by Mr. Hyndman, great quantities of eels met with a similar fate in the river Lagan.* They were seen by him floating down the stream dead, at the long bridge in this town. It is most probably in reference to 1814 that Mr. Templeton has remarked in his Catalogue of Irish Vertebrate Animals, that 'great numbers of eels inhabiting the shallow watery mud on the shore of Belfast Lough were killed during a severe winter.'† It is worthy of remark, that at the time just mentioned the wind was also easterly. In the Meteorological Report for Jan., 1814, published in the Belfast Magazine, it is observed, 'The continuance of the wind in the East for a longer time than usual has produced such a degree of cold as the oldest person in Ireland cannot remember. Notwithstanding the rise of the tide, a sheet of ice has covered the Bay of Belfast, strong enough to enable people to walk about with perfect safety over the channel, and full half a mile from the quays. Lough Neagh has also been so much frozen as to allow people on horseback to ride into Ram's Island, situated two miles from the shore.' I have been credibly informed that at the same period laden carts were taken over the ice to the island, and that some sportsmen of the neighbourhood had a drag or trail hunt upon the lake, and followed the hounds on horseback.

"A lighter, when coming to Belfast on the 6th or 7th of the present month, on breaking the ice at a part of the river where the banks are not uncovered to the same extent at low water as where the eels were chiefly killed, exposed a number of them, which, though not dead, were so weak as to be unable to offer any resistance, and were lifted into the vessel. On the days which proved fatal to the eels here great numbers were likewise found dead in the bay at Dundalk.

"The minimum thermometer at the Belfast Library indicated on the morning of

January 7, 1841 . . 19.00		
— 8, — . . 18.50	Wind South-West; moderate.	
— 9, — . . 18.50		
February 6, — . . 27.75		
— 7, — . . 27.75	Wind very high from the East; dry.	
— 8, — . . 27.50		

"Donegal Square, Belfast, Feb., 1841."

Eels have on several occasions been the means of cutting off the supply of water to dwelling-houses in Belfast, by entering the pipes; and during an extensive fire which occurred here, on the night of 8th March, 1846, a fire-engine was suddenly stopped in the midst of its labours to extinguish the flames, and the hose eventually burst, in consequence of an eel about 18 inches in length completely stopping up the pipe at the extremity of the hose, where it was held by the fireman. A portion of the eel's head,

* About the middle of February, 1855, the frost was so intense that great numbers of eels were found dead in the Lagan, near Belfast; and Lough Neagh was so completely frozen that many people walked from the mainland to Ram's Island.—Ed.

† Mag. Nat. Hist. vol. i. new series.

which projected from the aperture of the pipe, was caught by a man in his teeth, and the fish was thus extracted.

The following story of an eel carrying off a knife and purse, though it occurred nearly two centuries ago, is still told by old people in the vicinity of Lough Corrib :—

"From hence (the river of Cong) an eele carried a purse of 13*s*. 4*d*. sterling, and a knife, for about 16 miles, thro' Lough Orbsen, till it was catched on the river of Galway, which thus happened. One William M'Ghoill, a fisherman at Cong, lighted on a good eele, and, being busie about catching more, thrust his girdle through its guill, which had the purse and knife in it: the eele by chance slides into the river with the purse and knife."—*O'Flaherty's West or H-Jar Connaught*, i. p. 49, written in 1684. Published by the Irish Archæol. Society in 1846.*

Strangford Eel.—I am disposed to consider this eel as distinct from the three British. I have been always of this opinion, formed at first from the localities (just those of spotted blenny) being different. It was on hard gravelly and sandy places that I found both specimens.

1st specimen.—Length, 7¼ inches.

D. begins 2¼ in. from snout (2¼ in. 7¼). Vent. 3 in. 2 lines from extremity of lower jaw, nearly ⅛ of the entire length before the P. (11 lines before to 75 behind P.); gape not extending so far as to be on a vertical line with the middle of the eye. Snout short and rounded. "Distance from the eye to the end of the snout equalling full twice the diameter of the former."

Snout shorter than that of *A. acutirostris;* that of *A. mediorostris* (which this approaches most nearly of the three British species) is said to be longer.

Sept. 16, 1835.—I obtained from under a stone at Donaghadee an eel same as the Strangford species.

THE BROAD-NOSED EEL, *Anguilla latirostris*, Yarrell,

Inhabits the waters of Ireland, Loughs Neagh and Erne, the river Shannon, &c.

Specimens from the South have not come under my notice, but there can be little doubt of its being found there.

"When at Toome (County Antrim) in Sept., 1834, a kind of eel was described to me as very different from the species (*A. acutirostris*) taken there in such abundance when entering the river Bann in autumn, on their passage from Lough Neagh to the sea. It was called 'Culloch, or hunter-eel,' and was stated to differ much in appearance and voracity from that species. A very intelligent fisherman at another part of the lake, distinguishing it by the name of 'Gorb-eel,' bore testimony to its voracious propensity.† He believes it to live chiefly on pollans (*Coregonus Pollan*), from the circumstance of having frequently known it to destroy these fishes when in the nets: the nets also being injured by them. He considers this species to be stationary in the lake, where it is sought for during summer with night lines, generally baited with very large worms or small perch: about 5 lbs. is the greatest weight he has known it to attain.

"In Belfast market I subsequently saw quantities of this eel from the above locality, when they proved to be the *A. latirostris*. On pointing them out to an angling friend, I was assured that he had seen similar eels from Lough Erne on sale in Enniskillen. A correspondent writing from Portumna, in allusion it is

* Dr. Ball obtained some years since, from the Rev. Charles Mayne, an eel of a uniform light yellow; it was taken at Killaloe: the colour was something like that of a well-bred ferret.

† Hence probably the name "Glut Eel," by which it was known to Pennant.

presumed to this species, mentions a large-mouthed eel, which preys much on fish, as an inhabitant of the river Shannon.

"Mr. Yarrell observes, 'In its habits the broad-nosed eel has not been distinguished by any peculiarity that I am aware of from the other common eel' (vol. ii. p. 299), but the following circumstances incline me to believe, in addition to what has been mentioned, that there is a further difference in this respect. On looking over some thousand eels taken in the nets at Toome, on the night of the 24th of Sept., I did not recognise one of the broad-nosed species, nor have I seen it among eels brought from this place to Belfast market, nor again with the *A. latirostris*, exposed here for sale, have I detected the common eel; but as it is from an examination in a very few instances that I speak, this may perhaps apply only in general terms. The season at which the two species are brought to this market is different, the time for the *A. latirostris* being summer, and autumn for the *A. acutirostris*. The intelligent fisherman before noticed states, however, that he has taken both species on his night lines at the same time. He knew the broad-nosed from the common eel before it appeared at the surface, by the greater resistance offered, and frequently it was brought up twisted round the line in its endeavours to become extricated from the hook.

"During the summer months the *A. latirostris* is brought in by the tide as it flows over the banks of Belfast Bay, and is taken by eel-spearers. A specimen $4\frac{1}{2}$ inches long that I examined, and which was procured off the coast of the County Antrim at mid-winter, had in proportion to its size every character as strongly marked as the largest of its species: the fleshy prominence on each side of the head and terminating at the nape, was very conspicuous."—*Ann. Nat. Hist.*, vol. ii.

"In my last paper on fishes (see Annals, p. 21 of the present volume) this species is stated to be called 'Culloch,'—by my having adapted the orthography to the sound of the word,—at Lough Neagh. It should rather have been *collach*, as, by reference to O'Reilly's Irish Dictionary, I have since ascertained this word to imply 'wicked,' and hence doubtless the origin of the name, the species being characterized as most voracious and as subsisting chiefly on other fish. The person who described it to me by the name of *collach* gave a direful account of this propensity, by stating that it preys on other eels, more especially at Coleraine Salmon-leap, where 'it *drinks* the young fry in.' The provincial names of Gorb and Glut Eel have obviously been bestowed upon it for a similar reason."—*Ann. Nat. Hist.*, vol. ii.

Mr. W. Todhunter, in a note dated in 1839, speaks of it as common about Portumna; but it is never taken with the sharp-nosed; he thinks (as the fishermen at Lough Neagh do) that it is not migratory.

In *July*, 1840, we took the young, about 2 inches in length, as well as those of *A. acutirostris* of similar size, on the sea-coast of the Co. Galway.

April 12, 1848.—I saw a number of very large ones in Belfast market, which were taken to-day in the bay, where they sometimes attain 4 lbs. weight. They were very typical specimens, the head being as round in outline as half a circle. They are called bulldogs, or bulldog-headed eels.

Mr. Meenan says it is sold at 3*d.* per lb. in Belfast market, and is considered coarse compared with the other. It is said by the Lough Neagh fishers not to leave the lake. A few odd ones are taken in the nets at Toome, and, when Mr. Finiston had the fishing, these were thrown to the pigs. The people who bought the other eels rejected them. Mr. M. has got 2 cwt. of them from Lough Neagh in a morning; four or five boats would have been engaged in taking them on their hooks; the men shoot their lines at night, and draw them early in the morning. Taken from April to July, or when the fishermen leave them for the pollans; not taken in winter.

THE SNIG EEL, *Anguilla mediorostris?* Yarrell,

Is taken in the North and South, and probably in lakes, &c., over the island.

An eel of the size, form, colour, and habits attributed to this species is commonly taken about Belfast. It roves and feeds by day, and is then usually captured by rod and line, with an earthworm as bait. The only one of these which I dissected had however processes to the first five cervical vertebræ, which according to Mr. Yarrell the sp. does not possess: for this reason a note of interrogation is given after the species.

Comparing a specimen which I took to London with specimens of Mr. Yarrell's, they were externally the same.

Mr. Yarrell, p. 399, mentions that this eel is considered distinct from the common sp. in Hampshire, and so the one I allude to is at L. Neagh, where (the late Mr. *Templeton*, in his Catal. p. 10, alludes to three varieties) the fishermen distinguish three species; this they call the *Weed-eel;* the *A. acutirostris* they call *Eel*, Skull-eel, or Bann-eel, par excellence; the *A. latirostris* they distinguish by the name of Gorb-eel, and Collach or Hunter-eel, on account of its comparative voracity. Small specimens from Youghal in Dr. Ball's collection have the external characters of this species.

Oct. 31*st*, 1836. A few days ago I obtained an eel from a person who had just caught it in the Lagan with his rod. Its "snout is rather long and moderately broad," gape extending to middle of eye, less than $\frac{1}{3}$ of the entire length before the D. (2 in. 5 lines to D., thence to end of tail 5 in. 7 lines), one-eighth of entire length before P. (1 inch from lower jaw to P., thence to end of tail 7 inches), P. small, length 4 lines, from lower jaw to vent 3 in. 3 lines, thence to tail 4 in. 9 lines.

Nov. 14*th*, 1836. I to-day examined an eel from the Bann, which a few days ago I at once recognised amongst a sackful of Bann eels as the "Weed-eel," which I got several specimens of at Toome, in Sept., 1834, believing them at that time to be quite distinct from the true Bann one (*A. acutirostris*). This specimen agrees in having the "snout rather long and moderately broad, gape extending not quite to a vertical line from the posterior part of the orbit, rather less than $\frac{1}{2}$ of entire length before the dorsals (it is $4\frac{1}{2}$ in. to $10\frac{1}{4}$ in.), and between $\frac{1}{2}$ and $\frac{1}{3}$ before the pectorals" (or $1\frac{3}{4}$ in. to 13), Jen. p. 477, vent $6\frac{1}{4}$ in. from extremity of lower jaw, thence to end of tail $8\frac{1}{2}$ inches. The colour of this eel is just similar to that of the specimen I got from Lagan on 31st ult., greenish olive, with a yellow tinge on back and sides, and rich gamboge yellow beneath. I thought it the *A. mediorostris*, until on dissection I found it possessed spinous processes on the first five cervical vertebræ.

A specimen from Youghal of an eel $6\frac{1}{4}$ inches long agrees in all characters with this species as described by Mr. Jenyns; its pectoral fins are rounded as in Mr. Yarrell's figure of this species, though I believe he says nothing on this subject: see difference between his fig. of *acutirostris* and of *mediorostris*, in this particular. I find the difference shown in the figures in specimens of both species.

THE CONGER EEL, *Conger vulgaris*, Cuv.,

Is common around the coast.

It is sought for chiefly in the months of May and June, but is doubtless to be had at all times. Conger eels are generally caught on long lines; to nets, when captured in them, they are very destructive. Mr. Meenan has

known them to destroy £3 worth of net in a night; he has got seven or eight hooks in one of them; they can bite through rope as thick as his finger. I have seen large quantities brought ashore by fishermen in summer and autumn, at various parts of the Down coast, all of which were taken on hook and line. They do not sell in Belfast market, but Mr. Meenan gets more for them by weight in Liverpool than for cod-fish and haddock.—April, 1850.

Mr. M. tells me that there is a kind of dark-coloured conger eel, which frequents rocky ground, and does not average more than half the weight of those taken in soft ground. I questioned him particularly about it, and found it to be in every respect analogous to rock cod.

A fisherman at Larne Lough states that these eels destroy the mullet caught in his nets so much that he sets lines outside his net for them, baited with what he calls "white bait." He has the double object of catching the eels and protecting the mullet. He dries and salts the eels like ling for his own use, with the difference of skinning the eels; the skins are all preserved, they are used for the hanging of flails, &c.

Robert Langtry, Esq., informs me that he once cut the head off a conger, and holding the severed head in his hand his servant set about taking the hook out of its mouth, when the teeth closed on his thumb, as if in life, and bit him desperately. It was only by cutting the jaws to pieces that the thumb was liberated.*

Mr. Templeton's note on this species is as follows:—

"Common.—Several years ago a vessel was wrecked on the coast of Rathlin, laden with salt herrings. The congers ate voraciously of the salt fish, and great numbers died and were washed on shore after this unlucky feast, for several days."—*Templeton's Catalogue.*

The conger eels in the neighbourhood of Cork suffered from the effects of cold in the early part of the year 1841, about the same time that a mortality prevailed among the sharp-nosed eels at Belfast, as mentioned when treating of that species. The facts relating to the conger were communicated to me by Francis M. Jennings, Esq., of Cork, in a letter dated 18 March, 1841, and published in the Annals of Nat. Hist., vol. vii. p. 236. From this letter the following extract is made:—

"During the 5th, 6th, and 7th of February, the ground being covered with snow and the weather intensely cold, the boatmen in the vicinity of Passage, Monkstown, and Carrigaloe, captured considerable numbers of the conger eel (*Anguilla conger*, Linn.) of all sizes, varying from a foot to five and six feet in length. Many of them were left on the strand as the tide receded, some dead, but the greater number alive; others were followed in boats as they swam near the surface of the water, and killed with sticks, whilst many committed suicide by swimming up on the strand. In a similar way they were caught from Hop Island to Ringaskiddy, a distance of five miles on the west side of the Lee, and from Smith Barry's Bay to the Limekiln opposite Monkstown, (about three miles) on the east side. Those which were taken on Hop Island seem to have been washed up by the tide, as they were dead.

"It appears strange that a fish like the eel, usually found at the bottom of the

* Mr. R. Patterson was witness, many years ago, at Holywood, to a similar occurrence. Two fishermen had brought the produce of their long-line fishing to the shore; among their captures was a large conger eel, off which they chopped the head, left it lying on the beach, and departed; a little bare-footed boy strolling along soon afterwards began "poking" his toes into the mouth of the eel. To his amazement the jaws closed on his foot, and held him fast until his cries brought the neighbours to his assistance.

river, should be affected by the cold, when one reflects that the depth of the river varies in some of these places from forty to sixty feet. The water here, though not quite so salt as the sea, is yet very salt."

THE ANGLESEA MORRIS, *Leptocephalus Morrisii*, Penn.,

Has been obtained on the north-eastern, southern, and western coasts.

It was first made known by me as an Irish sp. in the following communication to the Zool. Soc. in 1835 (see Proc. p. 82):—

"*Leptocephalus Morrisii*.—By the kindness of scientific friends I am enabled to mention the occurrence of six specimens of *L. Morrisii* on the coast of Ireland. Dr. Ball has thus written me respecting it. 'The first I saw was at Cove, in 1809. . . . . I was at the capture of a second at Clonakilty, in 1811. I caught one myself at Youghal, in 1819, and procured another which was taken there. The fifth, the specimen which I have preserved, was taken in a shrimp-net at Youghal also, in 1829, the four others having been found under stones near low-water mark.' I also got one from Dr. Allman, which he took on the coast of Cork. Dr. J. L. Drummond informs me that when in Bangor (Co. Down), in June, 1831, a specimen of the *L. Morrisii* about 4 inches in length was brought to him. It had been just taken from a pool left in the sand by the ebbing tide, and was almost perfectly transparent."

The following note was published by me in Charl. Mag. Nat. Hist., vol. ii. p. 20:—

"ANGLESEA MORRIS. *Leptocephalus Morrisii*. Early in the summer of 1837, Capt. Fayrer captured a specimen of this singular fish in the harbour at Portpatrick. He remarks that 'it appeared in an active state of health and vigour, sporting now and then on the surface, and as quickly descending.' On account of its delicate organization, it was judiciously put in very weak preservative liquor, about one part only of common spirits to four of water; and was thus kept by me for four months, without being injured as a specimen. It was almost equally transparent as it had been in its native element. When put in stronger liquid, for permanent preservation, it of course became discoloured, and more opaque. It is so buoyant as to float on the surface like a cork, and on the phial being reversed as quickly attains this position. The specimen is $5\frac{1}{2}$ inches in length (the size of Dr. Ball's specimen); and in the spotting differs from others described and figured. Distant $1\frac{1}{4}$ inch from the anterior extremity small black dots appear on the lateral line, and continue to the tail; $\frac{3}{4}$ inch from the same part a row of black dots—larger than those on the lateral line—commences, and extends on each side to within $\frac{3}{4}$ inch of the end of the tail; from where these terminate the black is taken up by the base of the anal fin; every ray—and they are here close together—being spotted at the base. Not a spot appears on the dorsal ridge, nor anywhere but as here mentioned. The *irides* are bright silver. I have elsewhere recorded a *Leptocephalus*, which was taken on the opposite coast of Downshire (Zool. Proc. 1835, p. 82)."

The *Ordnance Collection* contains a specimen labelled "Cairnlough [Co. Antrim], 1837;" and Mr. M'Calla informed me in 1840 that he had obtained three fishes on the Galway coast which he believed to be of this species. One of them, which I saw in his possession at Roundstone, preserved in muddy spirits, seemed to be the Anglesea Morris.

Dr. Harvey observes (in the Cork Fauna),—

"*L. Morrisii*, Penn., Anglesea Morris.—I watched for some time a number of fish in Cork Harbour, a few months since, which I have no hesitation in considering as of this species. I was unable to procure a specimen. It had been found by Dr. Ball previously."

Dr. Ball's specimen, labelled "Youghal, 1829," measures $5\frac{1}{2}$ inches in length. (It agrees with the generic description of Montagu, Wern. Mem., vol. ii. p. 438.)

"4½ lines in breadth; thickness less than a line; the dorsal fin is to the unassisted eye transparent; it commences at the back of the head, which, perhaps, warrants Pennant's description of the 'dorsal fin extending the whole length of the back.'"

Mont., vol. ii. p. 438, states that the dorsal fin "commences at nearly ⅓ of the length of the fish from the head." Anal fin as stated by Montagu; pectoral fins a line in length; gill aperture small; a row of very minute black spots on the margin of the back and on each side the belly; the lateral line is in the centre, and is marked throughout with minute black spots, which are however larger than those before mentioned.

Dr. Ball observed, in reference to this fish,—"When alive it is so transparent that the eye alone is visible." *

THE BEARDLESS OPHIDIUM, *Ophidium imberbe*, Linn.,

Is known as an Irish species only from the memorandum in Mr. Templeton's Catalogue, which will be found as a foot-note to the article on the next species in the present volume.

DRUMMOND'S ECHIODON, *Echiodon Drummondii*, Thompson,

Has been once taken on the Antrim coast.

The following communication was made by me to the Zool. Society in June, 1837, and is here transcribed from the Society's Proceedings for that year.—

"XVI. *On a new Sub-genus of Fishes, allied to* Ophidium. *By* WILLIAM THOMPSON, *Esq., Vice-President of the Natural History Society of Belfast. Communicated by the Secretary.*

Read June 13th, 1837.

THE species of *fish* which is the subject of the present communication ranks under the *Malacopterygii Apodes*, and in its genus most nearly approximates *Ophidium*. Although with *Ophidium*, as described in the Règne Animal (t. ii. p. 358, 2nd ed.), it possesses many characters in common, others are at the same time presented, which have suggested the propriety of constituting it a sub-genus. Cuvier having given as a character of *Ophidium*, "l'anus assez en arrière," strictly considered,† prevents the admission of the present specimen. The genus is, again, in the Règne Animal, subdivided into the true *Ophidia* and the *Fierasfers*; the former "portent sous la gorge deux paires de petits barbillons, ad-

* A specimen taken in Belfast Bay was presented to the Museum of the Belfast Nat. Hist. Society, in 1853, and exhibited in a recent state by Mr. Patterson at a meeting of the Society held on the 23rd Feb. in that year. It had been examined by him when alive the previous day; its very beautiful eye was the only conspicuous portion of the body as it swam about. When dead it was spread out on a newspaper, by Mr. Garrett, who was able with perfect ease to read the printing as seen through the transparent body of the fish.—ED.

† It may, perhaps, be objected to this strict reading, that Cuvier has himself admitted into the genus the *Oph. Vassalii*, which is described by Risso as having "l'anus situé près de la gorge" (tom. iii. p. 212, ed. 1826); but, although the characters of this species are pretty fully detailed in the Règne Animal (tom. ii. p. 359), the one here quoted from Risso is not mentioned. The last-named author similarly describes the position of the vent in the *Oph. fierasfer*. On the contrary, both of the British *Ophidia*, figured by Pennant (Brit. Zool. vol. iv. pl. 93, ed. 1777) and Montagu (Wern. Mem. vol. i. pl. 4), accord with Cuvier's generic description in this character.

hérents à la pointe de l'os hyoide," and the latter "manquent de barbillons, et leur dorsale est si mince, qu'elle ne semble qu'un léger repli de la peau."

In external characters—for the specimen being, so far as known to me, unique, I have been unwilling to injure its appearance by dissection—it is excluded from the *Ophidia* proper, in consequence of not having the barbules; and though agreeing with the *Fierasfers* in the negative character of wanting these appendages, yet, by having the dorsal fin strongly developed and elevated, it ranges not with them.

Its want of the very obvious character of the *Ophidia* renders all comparison with them unnecessary; but of two species belonging to the *Fierasfers*, and which approach the present specimen most nearly, I may state, that it possesses many of the characters of the *Oph. fierasfer* of Risso, but differs from that species in the teeth (both jaws are described as armed with three rows of sharp and hooked teeth), number of fin-rays, and some minor characters; besides, there is nothing said of the remarkable teeth terminating both jaws, as exhibited in my specimen. In the Règne Animal we again find an *Oph. dentatum* described as having in each jaw "deux dents en crochets," but no further details are given. In this only character, however, the *Oph. dentatum* differs from my fish, which has four large hooked teeth in the upper, and two in the under, jaw.

The specimen under consideration was found dead on the beach at Carnlough near Glenarm, in the County of Antrim, by my friend Dr. J. L. Drummond, when collecting *Algæ* there in the month of June, 1836, and, along with some other *fishes*, &c., obtained about the same time, was kindly handed over to me on his return to Belfast. Dr. Drummond informs me, that from its appearance when found it had most probably been cast ashore by the tide of the preceding night, when a strong easterly wind prevailed.

Genus Echiodon.

Corpus valdè elongatum, complanatum et lanceolatum.

Caput ovale; *rostrum* mediocritèr productum; *os* sub-obliquè fissum; *maxillæ* dentibus armatæ sicut ossa palatina vomerque; *dentes* duo utrinque apud maxillæ superioris apicem magni et prælongi; *maxilla* inferior utrinque dente unico cylindraceo terminata; apertura branchialis magna; *operculum* satis amplum.

Pinnæ dorsales et anales valdè productæ.

Anus anteriora versus positus.

Echiodon Drummondii.

Tab. XXXVIII.

Ech. corpus lævе; maxillæ ambæ, vomer, ossaque palatina dentibus parvis obtusiusculis densè armatæ; maxilla superior longior, cujus dentes externi ore clauso conspicui; vomer admodum prominens antrorsumque valdè productus; lingua brevissima; pinnæ dorsales analesque cum caudali continuæ, et posticè corpore multo altiores; pinna analis ante dorsalem exoriens; radii pinnales nulli ramosi; membrana branchiostega septem radiata.

Total length 11 inches; greatest depth (at 1 inch 4 lines from the snout) 6 lines, thence posteriorly gradually narrowing; greatest breadth of body anteriorly 3 lines; at the middle of the entire length 1 line, and thence to the tail becoming gradually more compressed.

Head 1 inch 2 lines long, or rather more than one-ninth of the entire length; profile sloping forward equally on both sides to the snout, which is truncated, and projects 1 line beyond the lower jaw; narrow, increasing in breadth very gradually from the snout, its breadth as 1 to $3\frac{1}{2}$ of its length; height half its length, compressed at the sides, and rather flat above from the eyes backward; from the eyes forward a central bony ridge; snout viewed from above somewhat bifid in consequence of the forward position of the large teeth on each side. A few large punctures extend from the snout below the eye, and are continued just behind it; a series of small ones closely arranged extend from the upper portion of the eye in a curved form posteriorly to near the edge of the pre-opercle, and thence a double row extends downwards. Nostrils very large, placed just in advance of, and before the centre of the eye, and in form a somewhat oval transverse aperture. Eye large, occupying the entire upper half of the depth of the head; its width greater than its height, in the length of the head, occupying the place of 1 in $4\frac{1}{2}$; its distance from the snout 3 lines, or equal to its diameter; consequently $2\frac{1}{2}$ of its diameters are contained between it and the edge of the *operculum*. *Operculum* rounded at the base, terminating above in a minute point directed backwards, strongly radiated, *striæ* distant; *pre-operculum* ascending vertically; cheeks smooth and soft. Mouth rather obliquely cleft. Teeth, two large strong ones, placed close together, and curving inwards at each side the extremity of the upper jaw, the two inner $\frac{1}{16}$th of an inch apart. In the lower jaw one slender rounded tooth, nearly 1 line long on each side, curving outwards at the base, and inwards at the point. Entire upper and under jaw and *vomer* densely studded with small bluntish teeth, somewhat uniform in size; *vomer* extending far forward, and very much developed, forming a cavity in the lower jaw, and in advance of the tongue when the mouth is closed; a series of rows of teeth similar to those last described on the palatine bones; all the teeth of the upper jaw exposed to view when the mouth is closed. Tongue short, not reaching within $2\frac{1}{2}$ lines of the extremity of the lower jaw, and apparently toothless. On the dorsal ridge, 1 inch from the snout, or $2\frac{1}{2}$ lines behind the *cranium*, is a short, stout, bony spine, not very conspicuous, and, excepting its extreme point, covered with skin: it is 6 lines in advance of the first ray of the dorsal fin. Scales none* (?) Lateral line inconspicuous, being a slight depression extending in a straight line along the middle of the sides posteriorly, or throughout the greater portion of its length, but anteriorly nearer to the dorsal than the ventral profile. Vent 1 inch 3 lines from the extremity of the lower jaw. Branchiostegous membrane opens forward rather before the extremity of the gape. Dorsal fin commencing 1 inch 6 lines from the snout, low at its origin, but gradually increasing in height to near the caudal fin, which it joins; the two or three anterior rays, which are very short, flexible, and simple † (?), remainder articulated. Anal fin originates just behind the vent, or at 1 inch 3 lines from the point of the lower jaw, joins the caudal fin, near to which it increases in depth posteriorly from its origin, deeper than the dorsal fin throughout; about $1\frac{1}{2}$ inch from the caudal fin the rays are in length four times greater than the depth of the body at the same place, the rays

* It must be observed, that had the specimen possessed scales of the same nature as those of the *Cepola rubescens* (Yarr. Brit. Fish., vol. i. p. 197), it may have been divested of them during its short exposure on the beach.

† As in *Cepola rubescens*.

of the dorsal fin opposite being three times the length of the body; the first and second anterior rays flexible and simple (?), remainder articulated. Pectoral fins originate 1 line behind the head, and are equal to half its length; central rays longest, all very flexible, placed below the middle of the sides. Caudal fin, central rays longest. Articulations very long on the rays of all the fins; no branched rays in any of them.

D. 180? A. 180? P 16? C. 12?—Br. 7.

Although the numbers of these fin-rays be marked with doubt, they were reckoned with the greatest care; but without injury to the specimen they could not be ascertained with certainty to a single ray. *Vertebræ*, which distinctly seen through the skin can be reckoned with accuracy, 98. Colours, anterior half a dull flesh-colour, similar to specimens of *Cepola rubescens* preserved in spirits, hence it is presumed to have been originally red; behind this portion reddish-brown markings appear on the body at the base of the dorsal and anal fins, and suddenly increase in number, until, from an inch behind the middle, the whole sides are closely marked and spotted over; the entire top and the sides of the head before the hinder line of the eye are similarly spotted; just behind the *cranium* a few spots also appear: the posterior rays of the dorsal and anal, and the entire caudal fin blackish. *Iris*, *operculum*, and under surface, a short way beyond the vent, bright silver.

The two large teeth, resembling serpents' fangs, which terminate the upper jaw on each side, have suggested the generic appellation of *Echiodon* (ἔχις, *a viper*, and ὀδοὺς, *a tooth*); and the specific name of *Drummondii* is proposed in honour of the discoverer.*

Although when this *fish* first came into my possession I saw that it might be classed under the *Malacopterygii Apodes*, and be placed near *Ophidium*, I considered that in a natural arrangement it would best constitute a new genus of the family *Tænioidea*. In being apodal it was not excluded from this family, as two genera belonging to it are destitute of ventral fins. I did not hesitate to place it under the *Acanthopterygii*, as some genera which are included in this order are, like it, strictly Malacopterygian, their natural connexion with genera having fins with spinous rays being considered—and in my opinion most philosophically—to out-

* In Mr. Templeton's Catalogue of Irish Vertebrate Animals, published in the Magazine of Natural History (new series) for 1837, we find the following remarks in reference to *Ophidium imberbe*. "The only specimen I have observed was thrown on the shores of Belfast Lough, near the White House Point, on January 9, 1809. It was a large specimen, not less than a foot long, and agreed so exactly with the figure in the British Zoology, and differed so much from that of Mr. Montagu (Wern. Mem. p. 95, pl. 4), that I am led to believe there are two distinct species, of which Pennant has described the one and Montagu the other." New series, vol. i. p. 412.

In endeavouring to gain further information on this subject from the late Mr. Templeton's papers (all of which, through the kindness and liberality of his family, are accessible to me), I have been only able to find the following note, which appears in his Journal, under date January 10, 1809. "Went to the White House to look for *Fuci;* found a fish about 18 inches long, more taper than an *eel*, at the thickest part about an inch and a half diameter. I think it was the *Ophidium imberbe*. Brit. Zool. iii. 398, t. 93, in vol. iv." It is much to be regretted that the information is not more precise, as it is not improbable that the species alluded to may have been identical with that which forms the subject of the present article. The White House Point and Carnlough Bay are in a direct line about twenty miles distant.

weigh this character; and further, I felt less reluctance in thus placing it, in consequence of *Cepola rubescens*, which it assimilates in some respects, having but one spinous ray, and that in the ventral fin. At the suggestion of John Edward Gray, Esq., F.R.S., I have, however, reconsidered the subject, and have come to the conclusion above advanced.

As a difference of opinion may still exist with regard to the position of this genus, I subjoin the observations originally made.

Like certain other genera which are comprehended under *Acanthopterygii*, the first order of the Osseous Fishes, its fins are altogether destitute of spinous rays, but like those alluded to, such as *Zoarces*, &c., its other characters* seem to point out the *Tænioides* as the family to which it belongs. Of the eight† genera of *Tænioides* already known, viz. *Lepidopus*, *Trichiurus*, *Gymnetrus*, *Stylephorus*, *Cepola*, *Lophotes*, *Trachypterus*, and *Alepisaurus*,‡ the specimen under consideration agrees with *Trichiurus* and *Stylephorus* in being apodal, or wanting ventral fins, but in this character only is there any generic accordance. Though considerably more elongated, from the head posteriorly it approaches most nearly to *Cepola rubescens* in the form of the body and in the forward commencement of the anal fin, which, with the dorsal, is prolongated until it joins the caudal; but it is only in the continuity of these fins until this junction is effected that the resemblance holds, as in my specimen the dorsal rays (of which the five foremost are very short) increase in length posteriorly, and near the caudal fin are about three times as long as the depth of the body beneath them; in the anal fin, which is throughout much higher than the dorsal, the rays likewise increase posteriorly, and near the caudal are in length four times greater that the depth of the body at the same place. The length of the posterior rays of these fins causes the dorsal, anal, and caudal to appear as one, whilst, though they do join in *Cepola rubescens*, the last ray of the dorsal and anal being much shorter than the outer rays of the caudal, may at the same time be said to mark distinctly the termination of each fin.§ In my specimen the anal originates two lines in advance of the dorsal fin.

In the form of the head and in dentition it differs so remarkably from all the other genera as to render a comparison with them unnecessary. Its absolute characters must suffice for distinction.

As Mr. Yarrell has, in his valuable work on British Fishes (vol. i. p. 185), suggested, that of the two specimens described as *Trichiuri* by Mr. Hoy in the Linnean Transactions (vol. xi. p. 210) the first may be the type of a new genus, it should be observed, that this individual approximates the specimen under consideration in but one generic, and that a negative, character, namely, the want of ventral fins."

A friend who has seen my specimen informs me that in June, 1841, he saw a fish captured on a hook baited with a sand-eel, between Bangor and the Copeland Islands (entrance to Belfast Bay), which he thinks was

* I allude to external characters only, being unwilling to dissect a specimen as yet unique.

† For the purpose of comparison, all the genera given by Cuvier in the Règne Animal and Hist. de Poiss. are here brought together.

‡ Zool. Trans. vol. i. p. 123.

§ For illustration of this, see Cuv. and Val. Hist. des Poiss. pl. 300. Two species of *Cepola* from Japan, the *C. limbata* and *C. marginata*, are (as has been observed in this work, tome x. p. 403) figured by Krusenstern with the caudal fin contiguous to the dorsal and anal, as in the genus *Anguilla*.

of this species. It was quite unknown to the fishermen, and I have hardly a doubt of my informant's correctness as to the species, as I showed him all the figures of the *Tænioides* and *Ophidium-like* fishes, in Mr. Yarrell's work, and he dissented from all but the *Echiodon:* he paused on *Cepola*, but said his fish was of a brown colour.*

THE WIDE-MOUTHED SAND EEL, (The Sand Eel, *Yarrell*, The Wide-mouthed Launce, *Jenyns*,) *Ammodytes Tobianus*, Linn.,

Is taken on the North-East and West coasts: probably on the South also. The following notes were published by me in the Annals Nat. Hist. vol. ii.:—

"*Ammodytes Tobianus*, Bloch. Wide-mouthed Sand Eel.—This species is rare on the shores of Ireland, as elsewhere, compared with *A. Lancea*. Of the latter, were specimens of *Ammodytes* favoured me by Dr. Ball from the coast of Cork, and, with one exception, all that I have taken from the stomachs of the cod and other fishes. Such likewise, judging from their size ('4 to 9 inches in length'), are those described in the Wild Sports of the West, as sought for on the coast of Mayo, and also those taken on the sands adjoining the village of Bushfoot near the Giant's Causeway. In this last locality, I speak on the authority of a gentleman who has often been present at the sand eel fishing, and who, on being shown my specimens of *A. Tobianus*, remarked that he had never seen any of those taken there at all approaching them in size. In a paper by Dr. J. D. Marshall on the Statistics and Natural History of the Island of Rathlin, published in a late part of the Transactions of the Royal Irish Academy, the *A. Tobianus* is enumerated among the fishes of the island; but I have the authority of the author for stating, that it is the common species now distinguished by the name of *A. Lancea* † to which he there alluded.

"*August 23rd*, 1836.—On inquiring at Dundrum on the coast of Down about sand eels, I ascertained that two species are procured in the extensive sands here; the larger of which is called 'Snedden,' and the smaller 'Sand Eel,' and that they are throughout the district considered as distinct as any two species of fish. This information induced me to attend the sand eel fishing to-day, when at the extreme of low water I had the satisfaction of seeing both *A. Tobianus* and *A. Lancea* taken indiscriminately. From the loose sand covered with water to about the depth of 9 inches, the persons engaged in this occupation with great dexterity drew these fishes from their lurking-places, using for the purpose old reaping-hooks. These are run through the sands with the right hand drawn towards the left, by which the fish is seized and transferred to a basked strapped round the waist and carried in front. It is in shape like the angler's, but much larger and open at the top. The *A. Tobianus* is said to be always scarce here compared with the *A. Lancea*, and is sometimes not to be found at all. An intelligent fisherman informed me that the greatest quantity he ever took of the former species during 'one ebb,' was twelve or thirteen quarts. It is by measure both kinds are estimated and sold, the *A. Lancea* producing from one to twopence the quart, and the 'sneddens,' being more highly prized on account of their superior size, one-half more. On inquiring how the two species are distinguished when of equal size, one man stated, by the difference of form, and

* The Literary Gazette of 21st February, 1852—the same number of that Journal which records Mr. Thompson's death—mentions, that at a meeting of the Zoological Society held on the 10th of February, Mr. Yarrell in the chair, that gentleman exhibited a specimen of this Echiodon. It had been found by Miss Helen Blackburn on the shore of the harbour of Valencia, County Kerry, after a violent storm from the West. This specimen was smaller than Mr. Thompson's, measuring only 8 inches in length, but quite perfect.—ED.

† Both species were until the last few years considered as one, which was designated *A. Tobianus*.

chiefly in that of the head; and another said he knew them by colour alone. Although the difference was in each respect very apparent to myself, I put both parties to the test, and found that the one guided by form, and the other by colour, drew the *A. Tobianus* from his basket with equal dexterity, and without a moment's hesitation singled it out from hosts of the *A. Lancea*. This fishing is carried on here daily throughout the year, except in winter, when being full of spawn the sand-eels are considered unfit to be eaten. At other times they are used by all classes of people. In the excellent hotel at Dundrum they were served up to us at dinner along with salmon, and were fried with crumbs of bread strewed over them—for breakfast they are similarly cooked. The poorer people dry them in the sun, and in bright days the tables and trays of the cottage are sure to be seen set out before the doors covered with sand eels.

"*August 27th.*—At Newcastle, about three miles South of Dundrum, great quantities of sand eels were taken at the morning ebb of the spring-tide; by some individuals so many as forty quarts. In the evening I reckoned about eighty persons out fishing, and having two one-horse carts in readiness beside them to carry away the produce; but the harvest that was then gathered fell short of requiring such extra aid.*

"Having observed a number of pigs at Newcastle daily frequenting the sand at the extreme edge of the retiring waves, I ascertained, as had been anticipated, that they were in search of sand eels. This, however, was not the chosen feeding-ground of these animals, as I subsequently saw them regularly driven out there to forage for themselves. The *A. Tobianus*, though taken here, is less frequent than at Dundrum.

"When at Ballywalter, on the coast of Down, and northwards of the last-mentioned place, in May, 1836, I found a few of *A. Tobianus* by examining the sand eels which fishermen were using as bait; and in the month of March following, obtained a specimen along with two of the *A. Lancea* from the stomach of a sea trout (*S. Trutta*) taken at Donaghadee. On questioning some fishermen at Portaferry, situated just within the entrance to Strangford Lough, in the same County, respecting the two species of sand eel, I learned that they had not been as such distinguished by them. It was however stated, that they occasionally obtained much larger individuals than ordinary, which from colour were named 'green-backs,' the common being called sand eels; the former both from superior size and different colour must doubtless be the *A. Tobianus*.

"Amongst a few fishes found dead on the beach at Cairnlough near Glenarm (County of Antrim) in June, 1836, by Dr. J. L. Drummond, was a specimen of the *A. Tobianus*. In this, as well as every other instance in which I have seen the last-named species, specimens of *A. Lancea* occurred at the same time.

"In the Wild Sports of the West there is a short but graphic account of sand eel fishing by moonlight on the coast of Mayo; and at Strangford Lough and other places in the North of Ireland it is likewise a favourite pastime of the young in the moonlight nights of summer. It is said that from the silvery brilliancy of the fish being more striking by night than day, it is at this time captured with greater facility; but is it not rather for the novelty of *dry-land* fishing, with the additional feature of being achieved by moonlight, that the sport is at this time practised?† Although the sand eel is noticed in several of the Statistical Surveys of the Irish Counties, there is not, that I recollect, any remark which would lead us to suppose that more than one kind has been observed; but there can be little doubt that both species are found elsewhere than on the coasts of Down and Antrim.

"The largest specimen of *A. Tobianus* obtained at Dundrum was 13 inches

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* "The coast [at Newcastle] affords plenty and variety of sea-fish; and such quantities of sand eels have sometimes been taken on it, particularly in the late season of scarcity, that the poor carried them away in sacksful."—*Harris's Down*, p. 81, published in 1744.

† Mr. Lukis states that in Guernsey they are sought for by moonlight.—*Yarr. Brit. Fish.*, vol. ii. p. 324.

long. D. 56 (first very short); P. 13; A. 29; C. 15. In all the characters of *form* and relative proportion of parts it agrees with the descriptions of Yarrell and Jenyns. In *colour* this species is of a dark bluish green, while the *A. Lancea* is of a sandy hue, like the atherine (*A. Presbyter*), but tinged partially on the back and sides with bluish green. From the mouth of the specimen described I took a small individual of its own species:* Bloch and Couch mentions similar instances.

"The largest *A. Lancea* procured at Dundrum was 8 inches long. D. 54; P. 11; A. 27; C. 14.

"Dorsal fin commencing 'in a line with the last quarter,' and not above 'the middle' of the pectoral fins."

Mr. M'Coy mentions (Annals Nat. Hist., vol. vi. p. 405), "This fish is frequent in the sand at Malahide, County Dublin, in company with the common species."

THE COMMON SAND EEL, (The Sand-Launce, *Yarrell*, The small-mouthed Launce, *Jenyns*,) *Ammodytes Lancea*, Cuv.,

Is common around the coast.

See remarks on this species, incorporated with those on the preceding one.

Terns and various other aquatic birds prey upon the sand eel, with which they frequently feed their young. Dr. Jas. D. Marshall says it "furnishes a favourite food to the different sea-fowl frequenting the island of Rathlin, Co. Antrim." He adds, "almost every sea-fowl I had an opportunity of examining had the mouth and stomach filled with the fry of this fish; and from the innumerable flocks of birds which reside here during summer the quantity of fry devoured at this period must be quite incalculable."†

Sand Eels.—Newcastle, Co. Down, July 26th, 1851. I walked to the inner bay of Dundrum to-day at low water, and came up with an old man and his son, who were on their way to the sand eel fishing. The old man had a rudely formed fishing basket slung behind him, and the boy carried an old shovel; to my inquiring why the shovel was taken, as I had never seen anything but old reaping hooks used here, it was replied that the fish were sometimes so deep in the sands that they required to be dug out; he also produced an old hook from his basket. I joined them to go to the fishing. We crossed the sand-hills over to the strait which lies between the outer and inner bays of Dundrum, and suddenly on a high sloping bank above the fishing-ground we came upon about twenty-five or thirty men, women, boys, and girls, lying there with their fishing baskets and other paraphernalia, awaiting the falling of the tide. On my remarking that it was a pity of the poor sand eels if they were all going to attack them, it was said, "We are not near all come yet." The fishing soon commenced, and I was surprised to see the *Ammodytes* shovelled out from shelly and gravelly sand, to a depth of two feet, on the surface of which my weight hardly left a foot-mark. I saw many

* An observant friend once saw a sand eel about 4 inches in length taken with bait, which was either a piece of herring or a composition of feathers—the latter a common bait for the coal-fish (*Merlangus Carbonarius*) in the North of Ireland.

† Paper on the Statistics and Natural History of the Island of Rathlin. Trans. Royal Irish Academy, 1836.

[24 adult sand eels were taken from the stomach of *Mergus serrator*, by Dr. Ball, in the winter of 1837.—ED.]

taken here, of various sizes, the largest with the milt (almost of a milky whiteness) flowing on the slightest pressure of the body; and the ova just ready for exclusion, they were the size of clover seed. The people said they were all of the large kind here, but I, thoughtlessly, did not look to the point, or bring away any of the fish. Seven inches, however, was about the greatest length of any.

The males and females were at once distinguished by the distended abdomen of the latter. None were taken here "with a hook," but this instrument was in requisition in the hands of two men elsewhere, who waded nearly knee-deep into the sea; and there stirred up the sand with it. The fishers say the sand eels change their ground, so as to be hardly ever two days at the same place; they never feel sure of finding them anywhere. I saw the fishing going on yesterday by the same party, about a mile distant from where they were to-day—to the North of the entrance to the inner bay.

The number taken is extremely variable; the greatest my informant has known by one person during an ebb, from forty to fifty quarts. During frosts, it is said, by far the greatest quantity is taken; they are chiefly eaten by the fishers and their families, but are also carried for sale to the neighbouring small towns, including Downpatrick and Ballynahinch, but not farther. They are sold by the quart measure.

Aug. 23*rd.* I saw several young sand eels from two to three inches long, in sandy parts near Annalong; I endeavoured to catch them in my net, but in vain, they so quickly disappeared in the sand at the bottom of the pool.

Sept. 20*th.* I questioned Mr. Brown of Dundrum and a head-fisherman to-day, respecting sand eels here; the purport of which is, that at spawning time in winter (when, however, the fish are so thin as not to be sought after generally for food) one man has, during an ebb, taken three bushels of them; in summer, too, one person has sometimes taken so many at a time as to require a donkey to draw them home. They come far up the bay to spawn: they are becoming gradually scarce, being more regularly followed and used as bait than formerly, yet they tell me that down to the last twenty years a thousand people, including many from five or six miles' distance, would come once annually for three or four days and bivouack on the sand-hills, living on sand eels and the potatoes that they would take from the nearest fields. On such occasions party-fights enlivened the proceedings, in which Dundrum suffered by attacks on the windows, &c., of each party. They were very lawless and uncivilized gatherings.

At spring tides the sand eels are sought for during the year, excepting the winter months, when poor from spawning; a thousand persons are still occasionally engaged fishing at the two sides of the inner bay (Dundrum and Ballykinlar), and on a good day will average from eighteen to twenty quarts * (about a hundred fish to the quart); a good fisher will take sixty quarts. This season there was but one very successful day, when seventy quarts were taken by the best fishers. The usual price at which they are sold is 1*d.* per quart. Lightning has a great effect upon them in causing them to bury themselves in the sands.

Amm. Tobianus, distinguished as *Snedden* from the sand eel by the

* My other informant (but not so good an authority) agreed respecting the number of persons, but thought they would not take one-half of what is above stated.

head fishermen. He says they differ from the latter, by keeping to softer sand, as they cannot quickly conceal themselves where it is hard, but where the sand suits there are plenty of the others also; it feeds chiefly on the small ones of *Ammodytes Lancea*; it comes far up the bay to spawn, attains to 18 inches in length. He contradicts the preceding so far as to say that he never but once saw sneddins by themselves; but during one tide he saw them; they are not nearly so numerous as the smaller species.

ORDER III.—LOPHOBRANCHII.

Div. I.—Osteodermi.

The Great Pipe-Fish, *Syngnathus Acus*, Linn.,

Is taken around the coast.

Mr. Templeton says of it:—"Rather a scarce fish, although found on both the southern and northern extremities of the island.—Seems to breed in spring."

To myself it has occurred commonly on the N. E. coast, chiefly in the dredge used in Belfast Bay and Strangford Lough, and I have seen specimens from all other sides of this island.

In July, 1840, when with Messrs. R. Ball and E. Forbes in the West of Ireland, it was taken in the dredge at Roundstone Bay. Dr. Ball remarks that it is called *earl* in the South, where this is a generic name for the *Syngnathi*.

A friend who has frequently watched the movements of pipe-fishes in Belfast Bay describes them as skimming along the surface of the water, in the summer evenings especially, like a slate thrown horizontally.—He has seen them skipping for 20 or 30 yards at a time, and also springing a foot high into the air.

I am indebted for the following notes to my friend R. Patterson, Esq.

"The pipe-fish now sent, which I take to be the young of the great pipe-fish (*Syngnathus acus*),* was taken in a small towing net on the 8th Aug., 1846, near Cultra. Some crustacea were captured at the same time, and one of them, of a common species of Gammarus, was placed with the pipe-fish in a glass vessel of sea-water. About half an hour afterwards I noticed that the Gammarus had seized hold with its feet of the body of the fish, which it clasped a little above the tail.

"The fish, apparently to get rid of this 'old man of the mountain,' began lashing the water vigorously with its tail, but without effect. It rested for two or three minutes, and renewed its efforts, but with no better success. It then rested again, and the Gammarus took the opportunity of the quiet to change its quarters by creeping along the back of the fish: it had got past the middle when the fish began turning round on the longitudinal axis of the body, as it might be supposed to do if in the process of being roasted on a miniature spit. It then staid quiet for a time, and the Gammarus got further forward, and exhibited itself in front of the dorsal fin. The fish then recommenced its revolutions, but they seemed so utterly unavailing that at length we took pity upon it,

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* It is so.—W. T.

and removed the cause of its uneasiness. The fish was now placed in a common white earthenware bowl, where it seemed to enjoy itself, spreading out the fan-shaped tail on the bottom of the bowl, and moving the head about, the entrance to the tubular jaws being at or near the surface of the water. Mr. Yarrell mentions its power of expanding the throat, but says nothing of the expansiveness of the tube. I do not know if the diameter is variable (it expands to double its ordinary width, W. T.), but the length is certainly so: for in an instant it becomes one-half longer, or one-third shorter, than the moment before. During the day it was in my custody its general position was that already mentioned, though it occasionally swam round the bowl."

"This fish is abundant in Lough Foyle, the largest yet met with measured 1 ft. 3 in. It was a female and contained in its stomach several shrimps, some broken, some whole."—*Ordnance Mem. of Londonderry*, p. 15.

The Deep-nosed Pipe-fish, *Syngnathus Typhle*, Linn.,

Has been obtained on the coasts of Antrim and Cork.

In 1837, I recorded, in the Zool. Proc., the occurrence of one example of this fish, taken on the coast of Cork; and subsequently in the Annals Nat. Hist., vol. ii., I published the following notice of the same specimen, and of the only other Irish one which I have yet seen:—

"*Syngnathus Typhle*, Linn. Deep-nosed pipe-fish.—An individual of this species above 8 inches in length, and obtained in 1835 at Glendore, County of Cork, by Dr. Allman, has been forwarded for my inspection by Dr. R. Ball. Among some small fishes taken along with crustacea, &c., in Larne Lough (County of Antrim), during the summer of 1836, by Mrs. Patterson of Belfast, and very kindly sent to me, was a specimen of *S. Typhle*. Though only 1 inch 2 lines in length, every character in proportion to its size was as strongly marked as in the adult fish."—(An. Nat. History, vol. ii.) *Youghal. Dr. Ball.*

Mr. Jenyns (p. 486) observes with reference to this species, that it is equally common with the great pipe-fish, if not more so. This remark does not apply to the Irish coast, so far as my own observations have extended.

The Æquoreal Pipe-fish, *Syngnathus Æquoreus*, Linn.,

Is occasionally taken on all sides of the island.

As recorded by me in the 2nd vol. of the Annals Nat. Hist.:—*

"*Syngnathus Æquoreus*, Linn. Æquoreal pipe-fish.—A specimen of this fish taken at Youghal (County Cork) has been submitted to my examination by Dr. Ball. Its length is 19 inches, rays of dorsal fin 40. It corresponds in all respects with this species, as admirably characterized by Mr. Jenyns (p. 486); as also does another individual obtained in the autumn of 1836, on the beach near Larne (County Antrim), by Mr. James Manks of that town, who presented it to the Belfast Museum. This specimen is 21$\frac{1}{2}$ inches long, but being imperfect at the caudal extremity must when entire have been at least one inch more. Its D. rays 41.—March 15th, 1838. I received from George Matthews, Esq., of Spring-vale (County Down), a perfect and beautiful specimen of this fish, which was found on the beach there after a high tide during the boisterous weather about the beginning of this month. Its length is 22$\frac{1}{2}$ inches. D. rays 46; caudal fin apparent to the naked eye; its rays, distinguished by a lens, 8 in number. This *Syngnathus* was in the present instance preserved and for-

* See also Proc. Zool. Soc. 1837

warded to me on account of the fishermen being unacquainted with it."—*Ann. Nat. History*, vol. ii.

I have since seen several specimens which were obtained on the Antrim and Down coasts, and Mr. M'Calla informed me that it occurs, though rarely, on the Galway coast.

A large example of this fish, taken at Killiney, was presented to the Dublin University Museum, in June, 1846, by Surgeon Carmichael.

In the Ordnance Mem. (Notices, p. 14), the following note occurs in reference to this pipe-fish :—" Specimens of this fish, in various stages of growth, have been obtained during this season (1837), from Larne and Carnlough, on the coast of Antrim."

THE SNAKE PIPE-FISH, *Syngnathus anguineus*, Jenyns,
— *Ophidion*, Bloch,

Has been obtained on the North-East, South, and West coasts.

The following notice of this species was contributed by me to the Annals Nat. Hist. vol. ii. :—

"*Syngnathus Ophidion*, Bloch. Snake pipe-fish.—From Dr. R. Ball I have received for examination two specimens of *S. Ophidion*, one procured in 1835 at Glendore (by Dr. Allman), and the other at Youghal. The larger one is upwards of a foot in length, and, with the unimportant difference of *its* having 41 rays on the dorsal fin, they agree in every character with the descriptions of this species by Jenyns and Yarrell, which are much more minute than Bloch's account of it. Dr. Ball has subsequently informed me of his having received a third specimen, about 14 inches in length, from Youghal, where it was captured in July, 1836. Soon after this time I received a *S. Ophidion* from the coast of the County of Antrim."

To this I have only to add, that in 1840 Mr. M'Calla informed me of his having taken this species under stones at extreme low-water mark, Roundstone Bay.

THE STRAIGHT-NOSED PIPE-FISH, *Syngnathus Ophidion*, Linn.,

Has been twice obtained on the Down coast.

The first specimen which came under my observation was thus noticed by me in the Annals Nat. Hist. (new series), vol. i. 1848 :—

"'*Syngnathus Ophidion*, Linn.,' Yarr. Brit. Fish. vol. ii. 447, 2nd edit.—A specimen taken in the dredge with oysters, at Killinchy, Strangford Lough, in October last, happened fortunately to be brought with them to Belfast market, where I procured it. Its length is eleven inches : the characters all as described by Yarrell. After being preserved in spirits for some weeks its colours are a mixture of very pale bluish and brownish olive, with a fine black interrupted or non-continuous line along the back from the head to the dorsal fin: whitish spots along the medial line."

In Oct., 1851, I obtained the second example among Carrickfergus oysters. It is about 8½ inches long.

THE WORM PIPE-FISH, *Syngnathus lumbriciformis*, Jenyns,

Is obtained on all sides of the island.

In the Zool. Proc. for 1835, I noticed this sp. under the name then applied to it, of *S. Ophidion*, Linn., as taken by Mr. Hyndman at the entrance to Strangford Lough, in March, 1832. The specimens were all adult, one of them having attained to 6 inches in length.

The D. fin-rays in this specimen were 30 : this fin commences 1 inch 9

lines from snout; occupies or extends for 8 lines; vent 1 inch 10 lines from snout.

I extract the following note from the Proc. Zool. Society for 1837, to which it was contributed by me:—

"*Syngnathus lumbriciformis*, Jenyns? Yarrell. As it has recently been discovered that two species of *Syngnathi* have hitherto been confounded under the name of *S. Ophidion*, it should be stated that those which I brought under the notice of this Society on June 9, 1835, as taken in Strangford Lough, are identical with the *S. lumbriciformis*, as described by Mr. Yarrell (Brit. Fish. vol. ii. p. 340). It may be added, that from Dr. Ball I have since received nine specimens which were taken by him in June, 1835, at the South Islands of Arran, off Galway, and from Captain Fayrer, R. N., several, likewise caught in the same month at Donaghadee.

"The dorsal fin and vent in all these specimens, including one from Belfast Bay, 19 in number, which are from under 3 to 6 inches long, about one-third of the entire length from the snout, and the head occupying about one-twelfth of the whole length. In these characters they correspond with Mr. Yarrell's description. Mr. Jenyns describes the 'dorsal and vent at about the middle of the entire length,' and the head 'scarcely one-seventeenth' of it.* Some of them exhibit ova 'in hemispherical depressions, on the external surface of the abdomen, anterior to the vent,' as mentioned in the Manual of the British Vertebrata, p. 489."

To this may be added, that specimens have since been taken in the dredge used in deep water, in Belfast and Strangford Loughs, and also at Larne; have been found on the shore of Tory Island (Donegal), by Mr. G. C. Hyndman; were obtained by ourselves, in July, 1840, at Roundstone, on the Galway coast, and at Lahinch (County of Clare), under stones between tide-marks; and specimens taken at Youghal and at Courtmasherry (County of Cork), by Dr. Ball and by Professor Allman, have come under my notice. It has been taken at all seasons of the year.

This and *S. Acus* are by far the most common—indeed are the only species to which the term common can be applied—pipe-fish on the Irish coast. *S. lumbric.* seems to be the most littoral species, which may perhaps account for my having seen even more of it than of *S. Acus*.

Templeton, in his Catalogue, gives *S. barbarus*; but I do not know to what species he referred. By *S. Ophidion* he probably meant the *S. lumbriciformis*.†

The Short-nosed Hippocampus, or Sea-Horse, *Hippocampus brevirostris*, Cuv.,

Has been obtained in Dublin Bay, and probably in other localities.

In 1849, Robert Callwell, Esq., of Dublin, lent me for examination a specimen of this fish, which he had procured, quite fresh, in June, 1843, when walking on the North Bull. It had just been picked up on the beach by a little boy who put no value on it.

Examples of the genus *Hippocampus* had been previously taken, as mentioned in the following notes. Some of these captures I recorded in the Zool. Proc. for 1837, and the Annals Nat. Hist. vol. ii., but as none of the fishes had been preserved the species was not ascertained.

"*Hippocampus brevirostris*, Cuv.? Sea-horse.—In July, 1821, a recent specimen of *Hippocampus*, presumed to be this species, was found on the beach at Red Bay, County of Antrim, by William Ogilby, Esq., F.L.S."—*Zool. Proc.* 1837.

* This has since been shown by Mr. Jenyns to be a different species.

† Taken in dredging in the river Liffey by Dr. Ball.

A *Hippocampus* was taken alive in Belfast Bay, in July, 1837, by my relative, Richard Langtry, Esq., and although ordered to be preserved for me it was unfortunately lost.

In 1838, Dr. R. Ball informed me that about four years previous to that time a specimen was found dead on the beach near Youghal.

Dr. G. J. Allman informed me, in 1839, that two small specimens of *Hippocampi*, each about an inch long, were taken by John Armstrong, Esq., from the stomach of a codling caught above Carlisle Bridge, Dublin, in Sept. or Oct., a year or two previously.

PLECTOGNATHI.

ORDER IV.—GYMNODONTES.

PENNANT'S GLOBE-FISH (Yarrell), OR STELLATED GLOBE-FISH, *Tetrodon stellatus*, Don., *Tetrodon Pennantii*, Yarr.,

Is only known to me from the following brief note which occurs in Mr. Templeton's Catalogue :—

"*Tetrodon* (Linn.), *stellatus* (Don.).—The only specimen I have known to be found on the shores of Ireland was seen on the Tramore strand, County Waterford, by Dr. Gabriel Stokes."

In Great Britain this fish has only been taken on the coast of Cornwall, where three specimens have at different periods occurred.*

THE SHORT SUN-FISH, *Orthagoriscus Mola*, Schn.,

Has been taken on each side of the coast.

In the Ordnance Survey Memoir (Notices, p. 14) it is stated that a "specimen was procured on the Magilligan coast in the winter of 1836-7."

A fish described to me as taken in the autumn of 1841 at Bushfoot, near the Giant's Causeway, must have been an *Orthagoriscus*.

An example of this fish, weighing about 3 cwt., which is preserved in Queen's College, Belfast, was taken on 15th Sept., 1851, off the Gobbins (County Antrim), by the crew of the revenue cruiser Wellington, whose attention was attracted by one of its fins projecting out of the water. It struggled desperately when attacked. This specimen was advertised for exhibition at Belfast as an "*Odd fish*." Another individual had been captured on the Antrim coast a few days previously, and was exhibited in Ballymena.

Dr. Jacob described a fish of this species in the Dublin Phil. Journal of November, 1826, which was taken in the previous month of August between the South-West coast of England and Dublin Bay. Mr. Yarrell remarks, that Dr. Jacob's is the best account of this fish that he is acquainted with.†—*Yarr. Brit. Fishes*, vol. ii.

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* Two specimens at least have been taken since Mr. Thompson's death, one on the coast of Wexford, and one on the coast of Waterford.—*R. Ball.*

† In the figure given by Dr. Jacob the pectoral fin is pointed like that of *O. oblongus*; it was not so in the specimen which I saw, but was a mistake of the artist.—*R. Ball.*

Dr. Ball informed me of an *Orth. Mola* being taken at the end of June, 1839, off Arklow, County of Wicklow. It measured 4 feet in length and weighed $1\frac{3}{4}$ cwt.

This fish was very fully described in an excellent communication made to the 4th vol. of Charlesworth's Mag. Nat. Hist. p. 235, by Dr. Bellingham of Dublin, to which the reader is referred. Four species of *Entozoa* found in it are also particularly noticed. I learned from Captain Walker, in 1846, that large specimens of the short sun-fish have occurred on the Wexford coast.

Between the years 1818 and 1825 Dr. Ball saw off the coast at Youghal five of these fishes, three of which he preserved. When on a visit to him in July, 1834, we saw for some time at a little distance the D. fin of a fish above the surface of the water, which there could not be a doubt was *O. Mola*.

Two of the specimens which Dr. Ball had procured attracted attention by the fin being thus seen above the surface, and were captured with a gaff.

Dr. Harvey tells us that he believes a specimen occurred in Cork Harbour in 1837 (Cork Fauna).

Mr. J. D. Humphrey mentions that three were taken in September, 1846, two off Cork Harbour and one off Youghal: in one of the former several *Tritoma coccineum* were found.

An example taken in Connemara, and weighing 6 cwt. 42 lbs., is described by Captain Bedford, R. N. See Illustrated London Reading Book, p. 170, published at office Illust. Lond. News, 1850.

The immense specimen in British Museum is noticed in Zool. Proc., 1849, p. 6.

THE OBLONG SUN-FISH, *Orthagoriscus oblongus*, Schn.,

Has been once at least obtained on the coast.

A specimen of this fish was, at the end of September, 1845, found by a peasant among a mass of sea-weed on the coast near Tramore, County of Waterford, and being seen by Mr. Trevor E. James, a gentleman connected with the Geological Survey of Ireland, was fortunately secured by him. It was given by that gentleman to Dr. Farran, by whom it was presented to the Nat. Hist. Soc. of Dublin, and who kindly wrote me of its occurrence at the time. Mr. Andrews, the secretary of the society just named, drew up a minute description of the specimen, which was read to the society and published in Saunders' News Letter of Nov. 17th, 1845.

Dr. Harvey favoured me with the following note, in 1847:—

"*Orthagoriscus oblongus*, Mr. Samuel Wright states that he took at Youghal in 1837. Its weight was about 112 lbs. He says it exactly corresponded with the *Oblong Sun-fish* of Shaw's Zoology, vol. v. part i. pl. 176."

There is a specimen of the oblong sun-fish in the Dublin University Museum, supposed to be a native one, taken at Wexford, as indicated by an old list of donations.

ORDER V.—SCLERODERMI.

THE File-fish (*Balistes capriscus*, Gmel.) has been obtained at Galway by Professor Melville, about two years ago.—*R. Ball*, 1855.

II. CARTILAGINEI.

ORDER VI.—ELEUTHEROPOMI.

THE STURGEON, *Acipenser Sturio*, Linn., (?)
— *Thompsonii*, Ball, M. S.,

Is taken occasionally in the large rivers from North to South.

The existence of sturgeons in Ireland has been mentioned by Sampson (Derry), Tighe (Kilkenny), Rutty (Dublin), Smith (Cork), and by Templeton in his Catalogue: they probably occur as frequently now as at any former period.

March 4th, 1839.—I saw one about 6 feet long in Belfast market, brought from Coleraine, where it was captured in the salmon nets. I should think it not less than 80 lbs. weight. Another was taken here two years ago; this fish is pointed on the snout, which is narrower than the mouth, and consequently differs from Parnell's *Acipenser latirostris:* the keel of the scales is at the same time depressed, as he figures that of his *A. latirostris*.

June 17th, 1846.—I purchased to-day in Belfast market a small specimen, which was taken in the sea last night at Donaghadee in a net with sea trout (*S. trutta*); it is being preserved for the Belfast Museum.

I looked critically to the food contained in its stomach and intestines, more especially as I always considered it improbable that fishes could, as stated, form the food of a species having a mouth like the sturgeon's. The stomach contained several specimens of minute crustacea (*Amphipoda*), the remains of a shrimp-like species, fragments of Porphyra, which probably had been growing on the sandy bottom of the sea, and a perfect minute *Tellina tenuis:* it likewise contained some fine sand, with which also the intestines were wholly filled.

It is 4 feet 4½ inches in *length*.

Fin-rays, in all the fins, much the same number as given by Jenyns, but all rather exceeding his. No specific difference in the numbers.

Osseous head-plates different in form from any of the four figures of native sturgeons of which Dr. R. Ball made drawings. These four all differ from each other in the form of these plates, and also in the *form of the head*, as looked down upon. The form of the bony plates in my specimen resembles more in form those of *A. latirostris*, Parnell, than any of the others, but the snout of my specimen is decidedly sharp-pointed.

Judging from all drawings which I have seen of the bony plates of the head of sturgeons, and finding them so variable, I have long felt certain that their precise form is of no value as a specific character; the form, too, of the anterior extremity of the fish is liable to much variation, from being pointed to rounded.

On 20th December, 1849, a sturgeon was taken at Belfast, close to the County Down Railway Station, where it was stranded when the tide ebbed. It was of the ordinary sharp-nosed kind, and about 4½ feet long. I subsequently learned that this fish lived 36 hours out of water, and was at last killed by being packed in ice to be sent to Liverpool.

April 29th, 1851.—Thomas Fortescue, Esq., of Ravensdale Park (the present Lord Clermont), informs me that in the river at Clermont Park, near that place, and belonging to him, a sturgeon is taken almost every year:

one about 6 feet long was captured last year and sent to him when in London. It being a "Royal fish," he presented it to the Queen.

I have also notes of the capture of sturgeons at Cushendall (Antrim), Dundrum (Down), Dundalk, Carrick-on-Suir, and Wexford.

In the County of Cork sturgeons have been frequently taken in the Blackwater and in the Bandon rivers, but more rarely in the latter. Dr. R. Ball has critically examined several Irish specimens, and is of opinion that they are not only distinct from the two species which have been recognised as British, but are undescribed: he has named the species *A. Thompsonii*.

I am unable to reconcile the sturgeon which I have called *Thompsonii* with the *Sturio* of Linnæus. I have collected a great many specimens, and the subject requires to be worked out. I do not think the broadness or sharpness of the nose a specific distinction, as no two of my specimens can be said to agree in the form of the nose, or the arrangement of the scales on the nose and head. Possibly more species than should be, have been made: I have now so many specimens that, it may be, a classification of their variations will reduce *Sturio*, *Thompsonii*, and *latirostris* to a single species. It would be desirable to get from the Continent a true *A. Sturio* for comparison.—*R. Ball*, 2 *June*, 1855.

"Sturgeons of from nine to ten feet in length are occasionally seen in the Dublin market."—*R. Ball.*

The Isinglass Sturgeon, *Acipenser Huso*, Linn.

In 1847 I contributed the following note to the Annals Nat. Hist., vol. xx.:—

"Isinglass Sturgeon, *Acipenser Huso*, Linn.—A notice of the occurrence of this species on the coast of Cork, in July, 1845, was communicated to the Annals (vol. xvi. p. 213) by Mr. John Humphreys of the city of that name. This gentleman, as well as Dr. Harvey of Cork, who subsequently examined the specimen, assures me that it was *A. Huso* as represented in Shaw's Zoology, vol. v. pl. 159. Mr. Humphreys has informed me of the capture of another specimen, which was taken in the second week of April, 1847, at Carrigeen, near Curriglass, on the river Bride, not far from its junction with the Blackwater. It measured 7 feet 8 inches in length, and weighed nearly 2 cwt."

Shaw's description of this species is as follows:—

"Isinglass Sturgeon, *Acipenser Huso*, Linn.—A larger fish than the common sturgeon, having been often found of the length of 25 feet; general shape the same; colour dusky, or blackish-blue above, silvery on the sides and abdomen, with a tinge of rose-colour on the latter; general appearance smoother than in the common sturgeon, the dorsal tubercles being less protuberant, and those along the sides much smaller, and in some specimens of a very advanced growth altogether wanting; mouth much larger than in the *A. Sturio*, with thick crescent-shaped lips; skin smooth and viscid. Native of the Northern, Caspian, and Mediterranean Seas, migrating from them into the adjoining rivers: found more particularly in the Volga and the Danube."—*Shaw's General Zoology*, vol. v. p. 375, pl. 159.

ORDER VII.—ACANTHORRHINI.

No specimen belonging to this Order has yet been recorded as Irish.—Ed.

ORDER VIII.—PLAGIOSTOMI.

THE SMALL-SPOTTED DOG-FISH,* *Scyllium Canicula*, Cuv.,

Seems to be common around the coast, and is as abundant in the North as in the South of Ireland, which does not appear to be the case in Great Britain. (See Dr. Parnell's remarks on this subject.)

This is by far the most common species of the *Squalidæ* on the N.E. coast, where it proves a serious nuisance to the fisherman.

May 2, 1838.—Of this fish 17 were taken to-day, by Richard Langtry, Esq., when mullet-fishing off the White House, Belfast Bay. On measuring, I found the few largest about 2¼ feet long. There was no difference in colouring according to sex, though a considerable difference in that of the specimens: not one had any tinge of yellow as a ground colour, such as represented by Donovan (pl. 55), but had the ground colour of the back and sides varying from grey to blackish,† and studded over with round spots of a darker hue. In some of both sexes these spots were very numerous and small; one large male exhibited only 2 or 3 large ones. Others had, in addition to the ordinary-sized spots, a few large black markings, about ½ an inch in diameter. Pennant's Spotted and Lesser Spotted Shark (pl. 19, ed. 1812) are certainly but one species, as remarked by Jenyns.

Jan. 3, 1839.—A female, which I obtained from Carrickfergus, was of a handsome *stone*-coloured ground, like that represented by Donovan (pl. 55), and covered over beautifully with small round spots, more than twice as numerous as those on Donovan's figure. It contained a number of eggs the size of marbles, and from these a series down to mere points: they were all round. This specimen was taken on a sandy bottom, and I should, *a priori*, have anticipated the difference in colour between it and those above noticed, the haunts being different.

Squalus Canicula.—Mr. Bernard Meenan says, too common everywhere: has seen this winter three creels-full, a cwt. in each creel, taken by one boat at Island Magee, on long-lines. The fishermen use them for putting in "buckie" creels to capture these shell-fish (*Buccinum undatum*).

Dog-fishes are said to be eaten at Roundstone,‡ as well as at the Isle of Man; and Dr. J. D. Marshall informs us that they are valued at Rathlin for the oil which they afford.

The stomach of one which I examined contained a *Gunnellus vulgaris*, and many opercula of the *Buccinum undatum*. Dr. Drummond states that in several others he found many of these opercula.

In reference to the season at which the young are produced, I may mention that on one occasion, in the month of May, I found a fresh specimen lying on the shore at Rockport, Belfast Bay, from which some of the tendrils that envelope the case containing the young protruded.

THE LARGE-SPOTTED DOG-FISH, OR ROCK DOG-FISH,
Scyllium Stellaris, Cuv.,
— *Catulus* (sp.), Linn.,

Frequents the North-East coast, and not improbably the coast generally.

* Also called "Dog-fish," "Blind Dog-fish," and "Rough Dog."
† It is worthy of note that they were taken on a soft, oozy bottom.
‡ Mr. Nimmo.

Mr. Templeton noted this species as taken "occasionally." The species has not come under my notice in the N., nor can Dr. Ball attest to its being seen by him on the Irish coast, but some ova sent to the Belfast Museum, in Dec., 1843, seemed to me to belong to this sp., and the following paper drawn up on them was published by me in the Annals Nat. Hist. in 1844 :—

"*On Ova believed to be those of the Large-spotted Dog-fish*, Scyllium Catulus, *Linn.* (Sp.)

"About the middle of December last there were sent to the Belfast Museum two plants of the tangle (*Laminaria digitata*), dredged together off Killinchy, Strangford Lough, from a depth of between two and three fathoms, and having many large and remarkable ova attached to them by tendrils, like those on the well-known 'purses,' as they are called, of the common dog-fish (*Scyllium Canicula*), though they evidently belonged to a different species. They were new to me and interesting in several respects. To the one plant of tangle were attached fourteen, to the other twelve, of these ova; of the fourteen, six were very old, six of 'middle age,' and two quite fresh—of the twelve attached to the other plant, four were very old, four of middle age, and four quite fresh. Those called fresh had the 'white and yolk,'" as in a newly-laid hen's egg; from those termed of middle age the young fish had probably long since escaped; none remained to bear testimony to its species. The age of the different ova was denoted, not only by their own appearance, but by that of the mollusca, zoophytes, &c., parasitical upon them;—on the oldest were *Anomiæ* an inch in diameter; *Discopora hispida*, *Tubularia ramosa*, *Cellularia reptans*, all full-grown; and on them, and those of middle age, were *Lepraliæ* (Johnston) of various species, *Nulliporæ*, and masses of the ova of *Buccinum undatum*.

"The number of ova of different ages suggested certain points of inquiry. Their deposition at three different periods of time on the same plant led to the suggestion that the fish may, like certain birds, as the different species of *Hirundines*, for example, return time after time to the same spot to deposit its eggs. We can indeed only infer that the same individual has deposited ova on the different occasions, but the probability is in favour of such inference. That the salmon (*Salmo Salar*) returns to its native river—if not to the same 'bed'—to spawn, we have a notable example in the North of Ireland, where, from the circumstance of the fish of the adjacent rivers Bann and Bush being distinguished from each other by certain peculiarities, those of every age from each river in returning to the fresh water from the sea are known always to seek the ascent of their native stream.

"Being unable to find any ova described like those under consideration, I made a sketch of one and submitted it to my friend Mr. Yarrell for his opinion, together with several queries, remarking at the same time, that as 'the ova are evidently generically related to those of *S. Canicula*, the first impression is, that they are those of the most nearly allied species, *Scyllium Catulus*, especially as we find those of the next nearest ally, at least among British species—*Squalus annulatus*, Nils. (*Pristiurus melanostomus*, Bonap.)—to be of a different form; but that, if they belong to *S. Catulus*, which is said not much to exceed *S. Canicula* in size, it will be singular that the ova should so greatly exceed those belonging to that species as to be double their size, and, in consequence of their much greater strength, about four times their weight. The transverse markings represented in the drawing denote plaits, which give to the exterior a handsome appearance; but they are not of specific value, the surface of some ova being quite smooth, of others partially or wholly plaited.' It was added —'Is it known *how often* the *Scyllia* deposit their ova? *how many* are deposited at one time? how long after deposition the young fish bursts its prison?' In the event of Mr. Yarrell's not knowing the ovum (which proved to be new to him likewise), he was requested to send the drawing, &c., for Mr. Couch's opinion. With respect to *S. Canicula* Mr. Yarrell remarked,—

"I never remember to have observed more than one egg in each oviduct ready

for exclusion, but there was frequently one other in each oviduct at the upper end, or about to separate from the ovarium, one on each side. How long they are in passing along the oviduct, how often deposited, and how soon after deposition the young fish leaves his cell, are points unknown to me; but I suspect, in reference to gaining his liberty, the young fish is rather in a hurry, for I have more than once taken very small spotted sharks swimming at large before the membranous bag of nutriment had been taken up into the abdomen, and before the young shark had begun to take food by the mouth. I will, however, send your sketch and queries to Mr. Couch.'

"This gentleman replied:—

'Polperro, Jan. 25, 1844.

'Dear Sir,—I feel an impression that the figure of a 'purse' which I received in your letter of the 24th December, is that of the large-spotted dog-fish, *Scyllium Catulus*. Both the British spotted dog-fishes certainly spawn twice in the year, as do many other species of fishes that are not commonly supposed to do so, a fact which I have ascertained by observation and dissection. But I have been somewhat unfortunate in reference to the larger-spotted dog-fish in not being able to obtain the ova of that fish directly from the body; a circumstance which arises from this fish going into deep water at the spawning time, when our fishermen do not find it convenient to follow them. I have obtained specimens, however, which I have been given to understand proceeded from this fish, and they very closely resemble the pencil drawing in size, form, and the raised ridge at the sides, and in the lengthened tendrils at the corners; the colour a dark brown; but I never saw any specimen with transverse plaits, which may throw doubt on the fact of its appropriation.*

'The ova of the *Scyllia* are deposited in pairs, an ovum descending at the same time to each corner of the uterus, but I am not able to say how many, constitute one laying, except that they are numerous. They certainly remain a considerable time before exclusion, a month or two at least, and perhaps more; for the corals to which they have been attached, and especially the *Gorgoniæ*, are often seen growing luxuriantly round the tendrils in a manner to show that most of this growth must have taken place since the deposit. Sometimes also their surface is studded with small shell-fish, as *Anomiæ* and Pectens, of a size to render it probable that the time I have assigned to them may even have been exceeded. Jonathan Couch.'

"As, reasoning from analogy, I came to the conclusion that the ova must be those of *S. Catulus*, and as Mr. Couch has received similar ones which were stated to be the produce of this fish, I have thought it desirable to publish so much as we know of the subject, and to give a figure of the ovum, although actual proof is still wanting as to the species to which it appertains. Some of my queries to Mr. Yarrell bore on the subject noticed in the conclusion of Mr. Couch's letter. Were it known how long the ova of the dog-fish were deposited before the young fish escaped, we could say that the adherent mollusca, zoophytes, &c., must have attained a certain growth within a limited period, but our information is not yet sufficiently positive on this head. The most newly deposited ova under consideration were externally quite free from all parasitical growth, which was at first sight, or before they were opened, a good indication of their freshness. But whatever the time may be in which the ovum of the allied species, *S. Canicula*, is deposited before the exclusion of the fish, proof is afforded by one in my collection, containing a young dog-fish of this species all but ready for his escape, that before its birth would have taken place the *Discopora hispida* attached to the outside of its case had arrived at full maturity.†

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* As before mentioned, these plaits are not of specific value.—*W. T.*

† Since the above was written, I have seen in the collection of Dr. R. Ball, Dublin, a similar case containing a young *S. Canicula*, on the exterior of which were groups of *Lepraliæ* of the full ordinary size, and two specimens of *Serpula triquetra* nearly an inch in length.

"Length of recent ovum of *Scyllium Catulus*? 4 inches 6 lines; breadth 1 inch 9 lines; depth 3—4 lines; surface smooth or plaited transversely; sides very strong and closely plaited throughout; tendrils very strong. Colour a uniform brown, but differing in shade in different ova.

"Belfast, May, 1844."

THE BLACK-MOUTHED DOG-FISH, *Pristiurus melanostomus*, Bonap., *Scyllium melanostomum*, Bon.,

Has been obtained on the northern coast.

We are indebted to the Ord. Survey for this addition to our Fauna, two individuals having been obtained by the collectors at Portrush, near the Giant's Causeway. Captain Portlock, in contributing a notice of this shark, observed that "in the work of Müller and Henle, the genus *Pristiurus*, Bonap., is described as having a row of small prickles on the tail-fin, and *Scyllium Artedi* is figured and described by Risso as having but a single row.—In Yarrell's description of *Scyll. melanostomum* two rows are mentioned, and in our specimens they certainly exist,—ought not, therefore, the single row to be dropped as a generic character, and Risso's termination of his specific characters used, viz. 'pinna dorsi extremitate [supra] spinosa?' may not the one and two-rowed individuals be of distinct species, and the black mouth be common to both?" Mr. Yarrell, in his second ed. of Br. Fishes, vol. ii. p. 497, says, "it has also been taken in the North of Ireland by Captain Portlock, to whom I am indebted for sketches, from which the different subjects forming the vignette at the end were taken."

THE FOX-SHARK, OR THRESHER, *Carcharias Vulpes*, Cuv.,

Can be announced only on circumstantial evidence as frequenting the Irish coast.

M'Skimmin, in his History of Carrickfergus (3rd edit. p. 358), notices the

"*Squalus Vulpes*, Sea-Fox Thresher; sometimes seen off the Copeland Islands, and heard after night making a noise with its tail against the water."

Templeton includes the species in his Catalogue, remarking merely that it is "rare on the coast, but occasionally seen about the Copeland Islands."

Major Walker, of The Lodge, County Wexford, noticed this species in a letter written to me in July, 1846, from the statement of fishermen who had seen a large fish beating a grampus or small whale in the Sound, between the two Saltee Islands, and who reported that every blow "sounded like the distant report of a cannon." This description will apply only to the species under consideration, which owes its name of Thresher to the propensity here mentioned.

"Mr. Couch says it is not uncommon for a thresher to approach a herd of dolphins (*Delphini*) that may be sporting in unsuspicious security, and, by one splash of its tail on the water, put them all to flight like so many hares before a hound."—*Yarrell's Brit. Fish.*, vol. ii. p. 523.

THE BLUE SHARK, *Carcharias glaucus*, Cuv.,

Is taken on the coast, chiefly southwards.

Dr. Ball informs me that this species is occasionally captured at the Nymph Bank, and also at Youghal. I examined the jaw of one from the former locality, in that gentleman's collection: the fish to which it be-

longed was 6 feet long. In my remarks on the Remora will be found a reference to the occurrence of the blue shark at Clontarf. Dr. G. J. Allman saw a specimen taken at Courtmasherry, and I learned from the late Mr. Nimmo and Mr. M'Calla that this species occurs on the Galway coast.

"A blue shark, 10 feet 1 inch in length, was taken near Clontarf wall, on Tuesday evening. It was seen in shallow water by Mr. N. A. Nicholson, who, with some fishermen, succeeded in driving him on shore, where they soon despatched him. Attached to the head were two of that curious fish the remora, so usually found on sharks in the tropical seas. This species of shark is not unfrequent on the Southern coast, but does not appear to be often seen of so great a size. The occurrence of the remora is, perhaps, the first authentic record of its being found on the Irish coast. The specimens have been secured for the University Museum, and added to the large collection of Irish fishes there accumulated.—*Dublin Evening Packet.*" *N. Whig, Aug.* 4, 1846.

THE PORBEAGLE, OR BEAUMARIS SHARK, *Lamna Cornubica*, Cuv.,
— *Monensis*, Cuv.,

Has occasionally been taken on different parts of the coast.

Templeton notices one as caught in Belfast Bay, and M'Skimmin notes the species as rare in the edition of his work published in 1829. In that of 1811 it has not a place; from which circumstance I am inclined to believe that it was in consequence of the occurrence of a specimen in 1815 that this fish was included at all in his list.

Templeton and he probably alluded to the same individual which was noticed in the Belfast Newsletter of 7th July, 1815. It was taken in a herring-net at Carrickfergus, and measured 5 feet 11 inches in length.

Of a specimen taken off Dublin Bay in September, 1838, and which came under my observation in a recent state, I drew up the following description:—[Several have since been obtained. *R. B.*]

Length 45 inches. Body fusiform, very narrow at the tail, and strongly keeled there on each side; skin smooth when stroked backwards (slightly rough in the opposite direction), of a uniform greyish black colour (under surface from jaw to C. fin white), diameter of the eye each way 1 inch, 5 rows of teeth on upper, 6 on lower jaw, 2 rows exposed on upper, 3 exposed on lower. 1st D. originates $14\frac{3}{4}$ inches from snout, occupies nearly $4\frac{1}{2}$ inches of back, from basal termination of 1st D. to origin of 2nd D. 12 inches; 2nd D. occupies $\frac{3}{4}$ inch at base, space between it and C. fin $4\frac{1}{4}$ inches, upper lobe of C. fin 9 inches long, lower lobe $7\frac{1}{2}$ inches long, and originating 1 inch nearer head than upper lobe, snout $2\frac{1}{2}$ inches in length from lower jaw, $3\frac{1}{4}$ inches from eye to end of snout; P. fin originates $9\frac{1}{4}$ inches from lower jaw, and is in length $7\frac{3}{4}$ inches. 1st D. $4\frac{3}{4}$ inches high, 2nd D. 1 inch 4 lines high.

The snout of this fish is pointed like Yarrell's figure of the Porbeagle, the eye large like that of the Beaumaris, the fins all formed as Johnston describes the Porbeagle. Johnston's description of Porbeagle in Yarrell just applies in every detail.

Dr. Ball has the jaws of a *Lamna* taken at Youghal in the summer of 1824: the fish was about 4 feet long, and the only one he ever saw there. When the gum is cut away 6 rows of teeth appear in both jaws; it agrees with *L. Monensis* in the teeth being sharper than those figured of *L. Cornubica* by Yarrell.

The teeth of this are similar to those in the specimen above described: they become gradually shorter and broader in proportion to their distance from the centre of the mouth backwards.

Mr. Nimmo informed me, that this species is taken both on long-lines and in nets on the Galway coast.

THE COMMON TOPE,* *Galeus vulgaris*, Cuv.,

Is found around the coast.

Several specimens, from 11 inches to 4½ feet in length, taken on the North-East coast, at various seasons of the year, have come under my examination, and I have notes of the existence of the species in various other localities, North, East, South, and West.

Mr. Templeton mentions the capture of a specimen 5 feet long, in Belfast Bay.

Mr. Yarrell describes the skin of this species as being "almost smooth," but in a specimen 1 foot in length I found it decidedly rough when I applied my hand from the direction of the tail towards the head; perhaps the roughness may be greater in the young than in the old examples.

THE SMOOTH HOUND, *Mustelus lævis*, Cuv.,

Is occasionally taken in the North and South.

The following notes on this species were contributed by me to the 2nd vol. of the Annals Nat. Hist. (p. 272) :—

"*Mustelus lævis* and *Hinnulus*.—I embrace this opportunity of offering a few remarks on the identity of the *Squalus Mustelus*, Linn. (*Mustelus lævis*, Will.), and *Sq. Hinnulus*, Blain.† (*Must. stellatus*, Risso). As some authors are agreed on this subject, it may perhaps be considered unnecessary to treat further of it, but I do so in reference to the place *S. Hinnulus* occupies in Mr. Jenyns's excellent Manual, p. 503. Here a short description is given of a fish taken at Weymouth, of which it is said that it 'appears to be identical with the *S. Hinnulus* of Blainville;' afterwards the remark is made, 'that it is a great question whether this last be anything more than a variety of *S. Mustelus*.'

"The following observations are on a specimen taken in Belfast Bay on the 16th of July last, and received by me before life was extinct. This individual combined in colour Mr. Jenyns's descriptions of *S. lævis* and *S. Hinnulus*, having, as the former is described, the 'upper parts of a uniform pearl gray,' and being 'paler or almost white beneath;' at the same time presenting with the *S. Hinnulus* ‡ 'a row of small whitish spots from the eye towards the first of the branchial openings; lateral line *indistinctly* (?) spotted with white; also a moderate number of small scattered white spots between the lateral line and the dorsal ridge.' The lateral line is in my specimen closely spotted with white, of a silvery lustre, from its origin to the extremity of the second dorsal fin, where this marking terminates; but a row of similar spots appears throughout the entire tail, beginning at the origin of the caudal fin on the upper side, and placed between its margin and the lateral line; 'a moderate number' of white spots, as described above this line, as far as the extremity of the second dorsal fin; these are larger than those on the line, and have the same silvery lustre; the short space intervening between the end of the second dorsal and the origin of the caudal fin is spotless. No spots on the body below the lateral line, nor on any of the fins, which are pearl grey; the pectorals varied with a whitish tinge along the margin, and the first dorsal with a dusky tip. Pupil of the eye black; irides silvery, with iridescent hues; eye 10 lines in length,§ oblong-oval in form.

* Sometimes called "Blue Dog-fish."

† Faune Française, p. 83, pl. 20, f. 2.

‡ "Brownish-ash" is given as the general colour by Mr. Jenyns; Risso describes the *M. stellatus* to be "d'un gris de perle en dessus."

§ The *Squalus Canicula* is so different in this respect, as from the smallness of its eyes to be commonly called *blind dog-fish* in the North of Ireland.

This individual agrees in every character with the *M. stellatus* as described by Risso,* Hist. Nat. l' Eur. Merid., tom. iii. p. 126. Mr. Yarrell's figure of *M. lævis* (vol. ii. p. 393) is a very good representation of this fish. The present individual differs from it in having a close row of spots along the lateral line, and both lobes at the base of the caudal fin conspicuously displayed, the anterior one nearly as much so as in the preceding figure of *Galeus vulgaris* in the same work.

"The specimen under description is a female. The stomach was filled with brachyurous crustacea, including a perfect and full-grown *Corystes Cassivelanus*.

"Other specimens of *Mustelus lævis* that I have examined, and which were about the same size as the one described, were similar in the characters above given; this is mentioned as showing that the white spots above the lateral line are not peculiar to the young fish. See Yarrell, B. F., vol. ii. p. 394." [P. 513 of 2nd edition].

Dr. J. L. Drummond procured specimens of this fish at Holywood (Belfast Bay) in 1846, and Dr. Ball has obtained it at Youghal and Dublin.

The *Squalus mustelus*, Smooth Hound-fish, of Sampson's Derry cannot, I presume, be this species, from the circumstance of his describing "5 or 6 rows of teeth;" consequently we must omit "Londonderry," given by Mr. Yarrell as a station of this fish. There can, however (though it is not proved), be no doubt of its occurrence there.

M'Skimmin, in his 3rd edition, notes it as rare. In his first edition the name *Stinkard* was applied to it, "from its leaving a bad smell on the hands after handling."

THE BASKING SHARK, OR SUN-FISH, *Selachus maximus*, CUV.,

Is taken on the ocean coasts of Ireland, chiefly on the West: I am not aware of its occurrence on the eastern side. It is generally known as the "sun-fish," and is the species so valuable for its oil.

In Harris's Down (published 1744) it is stated that—

"The coasts of Ireland, especially those in the West, have, of late years, been much frequented by *Whales* and *Sun-fish*, which come in March or April, and stay till November.

"They frequent the herring bays in the fishing season, and not only destroy a great deal of fish but mar the fishing."

The following paragraph appeared in the Derry Sentinel in July, 1849:—

"*A Shark caught in Lough Foyle.*—As Messrs. William Gillespie and Thomas Lecky, jun., of Longfield, were out behind the Shell Island, on Wednesday last, fishing plaice, they caught a shark of the species called '*squalus maximus*,' or, as Pennant names it, 'the basking shark.' It is evidently a very young one. It measures 5½ feet long, and 2 feet 2 inches in circumference; the colour of the back is a deep leaden, and that of the belly white; the skin is rough, like shagreen, and the upper part of the jaw and upper part of the tail much longer than the lower. The teeth are evidently only beginning to grow, and are about ¼ inch long, in three or four rows. Some of the oldest inhabitants of the neighbourhood agree in saying that they never heard of a fish of a similar kind being caught in Lough Foyle, and it is very unusual at all to see them on the North coast of Ireland."

In August, 1840, Dr. G. J. Allman informed me that "a fine specimen of the *basking shark* was lately entangled in the fishermen's trammels in

* The figure of *S. Hinnulus* in the Faune Française shows the identity.

Courtmasherry harbour, and towed to shore; it was nearly 30 feet long."

Dr. Ball, in a lecture on the fishes of Ireland, May, 1839, states,—

"As to the propriety of encouraging the pursuit of sun-fish, from my own inquiries on the coast of Galway I doubt the policy of doing so; it certainly appears that the capture of one of these enormous fishes, measuring from 30 to 40 feet in length, would produce some £80 worth of oil, but then the appearance of the fish is so uncertain, and the number so few, that the taking of one is quite a lottery. I believe the real fact to be that the value of the sun-fish taken on the coast of Galway would by no means remunerate the number of persons who have engaged at different times in the fishery; while some made money, many more lost time, which may have been profitably employed in ordinary fishing. The pursuit of sun-fish, if undertaken by gentlemen in their yachts, would add no contemptible item to the list of wild sports of the West. Sun-fish are struck with harpoons, and afterwards killed with lances; and the capture, from its gamboling, uncertainty, difficulty, and danger, possesses the excitement which renders many sports attractive, but which excitement, applied to industry, may urge on the current rapidly for a while, but only to divert it from its proper channel, to run waste in riot when successful, or stagnate in the pool of despond when the reverse."

"The western coast of Ireland abounds with the Sun-fish or Basking Shark."—*Hardiman's Galway*, published 1820.

The Picked Dog-fish,* *Spinax Acanthias*, Cuv.,

Is taken around the coast.

A specimen of this fish, containing young and eggs, was obtained at Carrickfergus, on 28th Dec., 1838, and forwarded to Dr. M'Donnell of Belfast, in whose possession I saw it. The following are my notes respecting it:—

It is 3 feet 4 inches long; colour of entire upper surface a dull slate grey, becoming paler downwards, the under surface white; on each side the ridge of the back are about 6 obscure round white dots (as in the fœtal specimens, and *vide* Donovan, pl. 82), but none lower down (as in the specimens and figure just named); there are a few obscure round dusky spots appearing indiscriminately over the body of the fish; eye 9½ lines in *length*, 6 lines high, irides silver, pupil black.

This fish contained 8 eggs of a roundish oval form, and from 1½ to 1¾ inches long, and from this size numbers down to a mere speck.

It contained 9 young in the oviduct, some of them so very slightly adhering that in a very short time they would have been excluded; these are of similar size, the 9 (the fishermen say the number is always odd) being each 9½ inches in length, and are in every respect perfect, excepting that a portion of the egg adheres to each: they are much handsomer in colour than their parent, being of a pearl grey above, with a row of round white spots, but few in number, on each side the ridge of back, and a series of white spots and elongate markings along the lateral line; the pearl grey shades away towards the under surface, which is pure white.

P. dull grey, tipped with white; 1st D. pearl grey tipped with black, anteriorly hinder portion white from base to tip; 2nd D. pearl grey, tipped

* Sometimes called "Piky Dogs" in the North.

with pure white, anteriorly with black on the central portion, and posteriorly whitish from the base upwards.

V. whitish; C. pearl grey, margined with white above and beneath, and tipped with black.

Eyes 4 lines long, 2¼ high; irides silver, pupil black.

Of the 9 young, 5 are males and 4 females, the appendage to the ventral fins marking the sex. The spines in all these are of as hard and strong consistence as in the adult fish; the spine on their 1st D. is 4 lines, that on their 2nd D. 6 lines in length. On opening one of the young ones the liver was found to be cream-coloured: in the parent it was somewhat of a yellowish grey colour, closely reticulated with a darker shade. The stomach of the parent was empty.

Mr. *Bernard Meenan* has seen the young ones swim off from the body of the parent after it was at least 3 hours dead (the fishermen have told him they have swam off 6 hours after death of parent); they swam round the body instead of going off: considered the most destructive of the dog-fish by the fishermen; taken all round the coast.

"Frequent in the bay, where it is well known that a wound from one of its spines is attended with great inflammation and pain for 2 or 3 hours."—*Rutty's Dublin*, vol. i. p. 347.

August 15th, 1851.—I saw one with the Rev. G. M. Black at Annalong, where, he informs me, it is the common species of shark. It is called *Dog-fish* here, and a blue-coloured shark, the next most common species to it (according to the Rev. G. M. B.), is called *Shark*. Mr. Black showed me the jaws of one of the latter, taken from a fish 4¼ feet in length. They were those of a *Galeus vulgaris*. The dog-fish, properly called *Scyllium Canicula*, is said to be very scarce here. *Oct. 13th*, 1851.—I looked over about twenty sharks brought in by boats at Newcastle, and they were all *Spinax Acanthias*. May not the reason of this shark being the most common species here be owing to its frequenting sandy ground, like that of Newcastle? *Scyllium Canicula*, the common species of Belfast Bay, is taken in muddy ground. *Oct. 17th*.—I saw a man preparing several *S. Acanthias* for dressing, by cutting off fins, tail, &c. The flesh looked beautifully white undressed, and he said it was as good as that of any other fish, though not marketable. The fishermen here use them as food.*

THE GREENLAND SHARK, *Scymnus borealis*, Flem.

I can only say of this species, that a shark sometimes taken by the Youghal fishermen at the Nymph Bank, and described by them to Dr. Ball, is considered by that gentleman to be the *S. borealis*.

THE ANGEL-FISH, ANGEL SHARK, OR MONK-FISH, *Squatina Angelus*, Dum.,

Is of occasional but rare occurrence from North to South.

I have notes of the capture of five examples of this species in Belfast Bay, the largest measuring 5 feet 4 inches in length, and 2 feet 9 inches in breadth: some of these are preserved in the Belfast Museum. One of them (taken in July, 1850) had in its stomach the remains of several dabs and plaice, five of which were nearly whole, and had been from 5½ to 8½

* Dr. Ball, in the Proceedings of the Royal Irish Academy, *27th April*, 1846, describes the apparatus by which the mother is defended from laceration from the spines of her young, a highly interesting anatomical fact.

inches in length; portions of other fishes; scales of mullet; not less than 50 eyes of fishes, and a bundle of *Zostera marina*, about 4 inches long and 3 broad. It was a female, and contained a large number of round eggs of various dimensions, from $\frac{3}{4}$ths down to $\frac{1}{8}$th of an inch in diameter. Ovaries 9 inches in length.

The stomach of another was filled with the remains of fishes and *Cephalopoda*.

Dr. Ball mentions the occurrence of the angel-fish at Dublin, and on the Waterford coast. Smith records it in his History of Cork, and it is said to have occurred on the coast of Kerry.—(See Cork Fauna, p. 24.)

The Torpedo, *Torpedo nobiliana*, Bonap.,

Has been, in a few instances, obtained off the East and South-East coasts.

Smith, in his History of Waterford, notices one as "taken off the harbour of Dungarvan and brought in there," about the year 1740: this was the first specimen noticed in the British Seas. A page of the work (p. 271, 2nd edit.) is filled with remarks on the torpedo, which the author felt assured the fish was, but he describes its tail as being "furnished with teeth like a saw," which rather indicates the caudal weapon of some of the sting-rays, trygon, &c.

The following notes were contributed by me to the 5th vol. of the Annals of Nat. Hist.:—

"*On a torpedo taken on the Irish coast.*—In the last week of October, 1838, a torpedo, taken on the Irish coast by a fisherman who supplies the Dublin market, was brought to the metropolis, and when quite recent purchased by Dr. Jacob, Professor of Anatomy, &c., to the Royal College of Surgeons. When in Dublin, some time afterwards, I embraced the opportunity of examining the specimen, which was at once afforded me with Dr. Jacob's usual kindness and liberality. The fish, from the careful manner in which it had been kept, was, with the exception of the electric organs (which had been removed), still perfect, and for every purpose of description in as good a state as could be desired. My chief object was to ascertain its species, as even in our latest works—those of Jenyns and Yarrell—that of the torpedo of the British seas is considered to be undetermined. Although the investigation was on the whole unsatisfactory, owing to the confusion in which the species of torpedo are at present involved, the notes made with reference to the works consulted on the subject may possibly be worth transcribing.

"Of Gesner's figures none accord with the individual under consideration, and if they be correctly drawn it differs in species from them. It does not agree with either of the torpedos given by Aldrovandus, nor with those of Johnston—his appear to be copies from preceding works. Willughby's figure (*T. maculosa*) is the same as that of Aldrovandus. With one taken on the coast of France, at Rochelle, and figured by Walsh in the Philosophical Transactions for 1773, vol. lxiii. tab. 19, my specimen is evidently identical; the only difference worthy of note is, that the spiracles are represented as notched, which they are not in the specimen, and this cannot be a sexual character, as Walsh's fish was a female as well as the present individual.* In the Phil. Trans. for 1774 (p. 464) Mr. Walsh records the occurrence of the torpedo on the southern coast of England, stating that it had been procured at Torbay, Mount's Bay, and Brixham. This gentleman likewise mentions his having been informed at the village of Ring, near Dungarvan, County Waterford, (where he was aware that Smith, in his History of this county, recorded a torpedo as having been captured about thirty years before his

* John Hunter likewise figures the spiracles notched in the largest engraving of the fish that I have seen, and a female is represented. Tab. 20. It follows Mr. Walsh's in Phil. Trans. 1773.

visit), that one or two of these fish are occasionally taken there in the course of a year. But in regard to species, the author in this communication describes a torpedo received from Brixham, which is certainly the same as the specimen under consideration. He observes, 'the back of it was of a dark ash-colour, with somewhat of a purple cast, but not at all mottled,* like those of the Atlantic coast of France, nor regularly marked with eyes, as they have been called, like some found in the Mediterranean. Its under part was white, skirted, however, with the same ash-colour, which towards its tail becomes almost universal. The side-fins being a little contracted and curled up, prevented the precise measurement of its breadth, but it appeared to hold the general proportion observed in those of La Rochelle; that is, the breadth was two-thirds of its length,' p. 465. Bloch's figure represents a different fish from the present one. Pennant copies Walsh's plate illustrative of the French specimens.† Donovan (vol. iii. pl. 53) does not inform us whence his figure was taken, but that it was not drawn from a recent individual may be inferred from the only original information he gives of the torpedo as a British species, being—'we can further say, upon the best authority, that this species has been more than once taken upon the sandy coasts near Tenby, in Pembrokeshire, South Wales.' His figure exhibits five spots, the spiracles notched, and the tail somewhat longer than that of the specimen before me. Risso's *Torp. unimaculata* and *T. marmorata*, fig. 8 and 9, tom. iii. ed. 1826, appear very different from my fish—the former displays spiracles with an even or circular margin; the latter has them notched. Blainville (Faune Française, p. 45) considers the *Torp. narke*, *T. unimaculata*, and *T. marmorata*, described as distinct species by Risso, to be only varieties of one. Blainville figures the three; the two last are longer-tailed than mine. *T. marmorata* approaches it more nearly in form, but is less clumsy: the spiracles are in all three represented as notched. Fleming (Brit. Anim.), not having seen specimens, describes from other authors. In the Phil. Trans. for 1834 (p. 542), Dr. Davy states that the *Torp. marmorata*, Risso, and *T. Galvani*, Risso, are identical—in this memoir two Mediterranean species are described, of which this one only approaches the specimen before me. Jenyns (p. 509) considers the British species of torpedo to be undetermined, as likewise does Yarrell, whose figure (vol. ii. p. 410) we may therefore presume has not been made from a native specimen.

"Of Dr. Jacob's torpedo, which is a female, the entire length is 34, the greatest breadth 23 inches; breadth across the ventrals 9¾ inches. The body is rounder and forms a greater portion of the whole than in Yarrell's figure (and still more so than in Willughby's, which the author just mentioned considers the same as his); it is 19½ inches long from the anterior extremity to the part of the body which is on a line with the extremity of the pectorals, and 14½ inches thence to the end of the caudal fin. The first dorsal fin, which is 3 inches in height, extends for 2 inches along the trunk of the tail, and terminates nearly on the same plane with the ventrals; the second dorsal fin originates about 1¼ inch behind the first; it is 2¼ inches in height, occupies 1⅝ inch of the tail, and extends within 1½ inch of the origin of the caudal fin—it thus nearly occupies the portion between the ventral and caudal fins: C. fin 5 inches in length, upper lobe the larger. Eyes minute, ¼ inch long and about the same broad, 2 inches 10 lines from the anterior edge of the body, 2 inches 4 lines apart; spiracle opening, circular or without tooth-like processes; a fimbriated process about an inch within the margin; several rows of small sharp teeth; vent about the middle of body within the ventral fins. Colour of the entire upper surface uniform reddish-grey, with obscure and small markings of a darker shade; a single dark spot ⅜ inch in diameter on the body a little to the left of the middle of the body; under side rich chalk-white, prettily bordered with reddish-grey, which colour forms a band

* Small dark markings appear scattered over both upper and under side in Mr. Walsh's figures.

† Pennant describes the spiracles of a torpedo which came under his observation, as having "six small cutaneous rays on their inner circumference."

about an inch in breadth round the pectorals, but narrower on the ventrals, and still more so on the tail.

"To recapitulate—in all the works noticed in this communication, and perhaps unnecessarily so, the only figures of the torpedo corresponding exactly in proportion with my specimen are Walsh's,* which are copied by Pennant. Those of the *Tremola*, illustrative of Dr. Davy's memoir, seem much the same. Two desirable points are however attained—the identity of the species with Walsh's specimens from the coasts of France and England, and the description of an authentic native example of the fish. From Dr. Jacob I learn that two torpedos were taken at the same time, about ten years ago, and he thinks off Dublin Bay, like the present individual; of one of these there is a cast in the Museum of the College of Surgeons in Dublin; † this I have examined; it is 38 inches in length, 28 in breadth, and represents the same species as the subject of the present communication."

A torpedo taken by the Dublin fishermen, which weighed 14¾ lbs., was described by Mr. M'Coy, in the 6th vol. Ann. N. H. as a new sp., under the name of *T. emarginata*. A figure of it accompanies the description, and appears very different in form from other torpedos taken on the coast. Dr. Ball, however, who saw the specimen in a recent state, is decidedly of opinion that it is not distinct in sp. from the others. That gentleman, having obtained a specimen taken off the Dublin coast on the 1st Sept., 1840, remarked, in a letter to me, that he felt convinced the specimen described by me and the *T. emarginata*, and also the one recently received, were identically the same sp., and adds, "I found that the slightest pressure at each side of the head was sufficient to make a shrugging of the shoulders, if I may so express it; or, perhaps more properly, to flex the joints of the cartilaginous arch, which supports the exterior of the lateral expansions or fins: this flexure produces the two indentations so obvious in the specimen described by Mr. M'Coy, while at the same time the edge all round is drawn in and thickened. Did the fish die in a state of spasm, it would, I think, present the form under which it has been named *T. emarginata*, while in its ordinary flaccid state it is *T. Walshii*. The slight difference of position of the dorsal fin, if not the result of irregularity produced in the drying of the skin, may probably be also an effect of the same cause as that which produces the indentations and the thickening of the edges of the fish. I did not however look to this point." ‡

In describing Dr. Jacob's torpedo, in the 5th vol. of the Annals, I gave it as my opinion, that it was identical with Walsh's, *the only difference worthy of note between my specimen and his figure being that the spiracles in the latter are represented as notched*, and, for the sake of identification, I subsequently proposed, in my Report on the Fauna of Ireland, to name the Irish specimens *T. Walshii*, in the then confused state of the genus. At that time I was not aware of the *T. nobiliana* of the Fauna Italica. With

* I do not recollect to have seen it anywhere satisfactorily stated, whether individuals of the same species differ much in general outline, or whether the sexes ever vary much in this respect—colour is admitted to be no character. See in particular Dr. Davy, Phil. Trans. l. c.

† Dr. R. Ball has an excellent cast from the present specimen.

‡ Dr. Ball has since confirmed his views, and ascertained that the form, which not unnaturally led Professor M'Coy to consider the specimen he describes as a new species, originated in its having been tied up in a handkerchief, by fishermen anxious to prevent injury. Dr. Ball, having received a specimen so treated, made a cast of it, and made another when the fish became flaccid—and thus obtained the two forms from one specimen.

this species Mr. Y. (in the 2nd edit. of his Fishes) considers British specimens which he has seen identical; and so likewise do I consider the Irish examples, for I am disposed to believe that there is not sufficient evidence for considering that any other species has ever occurred on the British shores. The spiracles have not been described as notched in any indubitable British specimen of torpedo; and even if they be so, I could not conceive two species, properly so called, of any animal of such large size, differing only from each other in the edge of the spiracles being notched or smooth. [Prince Bonaparte confirmed this when visiting the Dublin University Museum. *R. Ball.*]

THE SKATE, *Raia Batis*, Linn.,

Is taken around the coast, but less commonly (in the North at least) than *R. maculata* and *R. clavata*.

The following notices of unusually large specimens of skate (species unknown) appeared in the newspapers:—

"CAPTURE OF A LARGE SKATE.—On Thursday, the 22nd instant, one of the Coosheen fishing-boats caught a skate which weighed 2 cwt. (224 lbs.); length, from nose to tail, 7 feet 3 inches; breadth 5 feet 8 inches; depth, through the body, 7 inches. The liver weighed 14 lbs. This huge fish was caught in the following manner:—A small skate got meshed, and was swallowed, with *a piece of the trammel* of the net, by the large one; and, being thus entangled in the netting, it was easily secured by the fishermen."—*Cork Reporter.* Copied into *Northern Whig, March* 29, 1849.

"EXTRAORDINARY FISH.—Two *skates* of an extraordinary size and weight were taken in the river Quoile, near this town, on Tuesday night last, one of which, a female fish, measured five feet in length, and the tail two feet; total length seven feet, and five feet two inches in breadth; it weighed upwards of two cwt. The other fish, a male, measured four and a-half feet in length, tail one foot and three-quarters; total length, six feet and a quarter, and breadth, four feet and three-quarters; it weighed upwards of one and a half cwt. There were also caught at the same time several very large conger eels, one of which measured six feet in length, and weighed upwards of forty pounds."—*Downpatrick Recorder.* Copied into *Belfast Mercury, July* 3, 1851.*

The rays are less known in Ireland than most other fishes, in consequence of their being rarely brought to market, and when exposed for sale they are usually in an imperfect state.

March 3, 1849. Two immense ova, of some species of *Raia* most probably, were sent me fresh and moist from Belfast fish-market. After being exposed to the dry air for 48 hours, they were weighed in the forenoon of the 5th, and were respectively 8½ and 9 ounces. Length 10½ inches, breadth 4½ inches. Thickness at outer edge ⅜ths of inch. These ova were brought up on the long lines of the fishermen in deep water, about the entrance of Larne Lough; they had never seen any so large before. Mr. Hyndman obtained one precisely similar at Ailsa.

THE SHARP-NOSED RAY, *Raia oxyrhynchus*, Mont.

Amongst the species of rays enumerated in Smith's Waterford, is the "*Raia oxyrhynchus*, called by Rondeletius, *R. oxyrhyncha major*, the Great Maid."

Sept. 5th, 1851. I saw the perfect tail and other remains of an immense

* A skate in the Dublin University Museum measured upwards of 7 feet in length; in its stomach was a large hake.—*R. Ball.*

ray of this species to-day, on the beach at Annalong. The "claspers" were about a foot in length.

THE SHAGREEN RAY, *Raia chagrinea*, Mont.,

Was obtained by the Ordnance Survey collectors at Portrush, in May, 1839, as appears by the specimen so labelled in their collection.

Captain Portlock remarked in reference to this species, that it "seems to take the place of *R. oxyrhynchus* on the northern coast."

THE HOMELYN RAY, OR SPOTTED RAY, *Raia maculata*, Mont.,

Appears to be found around the coast.

In the North and East, where I have had the opportunity of seeing rays, this sp. appears to be about equally common with *R. clavata*, these two being by far the most common species.

The *R. maculata* is described by Yarrell and Jenyns to be "smooth," but of the several specimens taken at various times in Belfast Bay and on the neighbouring coasts, and examined in a fresh state, only one was smooth; the skin of this individual when preserved and dry was slightly roughened, both above and below, with minute tubercles.

There can be little doubt that the "*Raia lævis vulgata* with two black spots, one on each side the back," noticed in Smith's Waterford, was this species. I have seen specimens from Youghal, in Dr. R. Ball's collection, and have seen it brought in by the fishermen at Howth, Co. Dublin.—See *Ord. Surv. Mem.* p. 15.

"*Raia miraletus*, Linn," Yarr. ?
— *rubus*, Don. ?

See young one in ovum case preserved in spirits, obtained quite fresh on Holywood Warren, Belfast Bay, Nov. 30, 1851, by Mr. J. R. Garrett.

Raia maculata. *Ray* received from Dr. Drummond, July 7, 1838, and bought by him of a Holywood fisherman, taken with lugworm.

It belongs to the first section of the genus *Raia*. "Snout sharp, more or less elongated," Jenyns, p. 510. It differs from the leading characters of *Raia Batis* in *having* the lateral margins of the snout *parallel*, the points of the spine on the lateral rows of the tail directed *backwards*, and the colour being beneath altogether *white* except the margins of the P. fins, which are dusky.

From the *oxyrhynchus* it differs in the snout being *very moderately* elongated, and *in* having the skin of the upper surface *granulated* instead of being "smooth."

From the *R. marginata*, in the last-named character.

From the *R. chagrinea*, in *having* a row of large spines on the ridge of the tail.

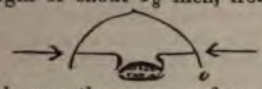
From the *R. maculata*, in being smooth.

From *R. clavata*, in *wanting* the "tubercles" entirely.

In form it agrees better with Yarrell's "Sharp-nosed Ray," p. 424, than any other, and has large spines just where they appear in the figure, and similarly disposed; the snout however is not just so long as here figured; the specimen is a male.

Its total length is 30 inches, greatest breadth 18 inches, length of body to commencement of vent 13 inches, thence to point of caudal fin 17 inches.

Teeth, a very few only can be called sharp-pointed, the others being

truncated at the summits, as if from use. Distance from extremity of lower jaw to anterior point of nostril $1\frac{5}{8}$ inch, thence in a continuous straight line to margin of snout $1\frac{3}{8}$ inch, from the same point to the margin thus,  2 inches.

Skin rough entirely over the upper surface, with very minute spines; a number of large spines, mostly directed backwards, near the margin of the body below the eyes; also a series of large spines forming a patch of elongate form within the extreme margins of the P. fins.

Spines, 3 rows of large spines on the tail, all directed backwards, the middle row not extending along the back nor further than the vent; at the distance of 5 inches from last large caudal spine, one appears on the back and another an inch in advance of it (not another large spine than those already described on any part of the body); the intermediate space has never been occupied by them. The under surface, from about on a line with the lower jaw forwards, rough, with minute spines, as is also the entire under surface of the tail, remainder smooth.

Two finlets before the caudal fin, which is very slightly developed, $\frac{3}{4}$ of an inch.

Colour, entire upper parts dull brown, closely blotched and spotted over with black, which gives it the general appearance of being blackish; under surface entirely white, except at the margin of the pectorals, which are dusky.

In general outline the fish is as like the Homelyn Ray of Yarrell, p. 429, as any other of his species; its pectorals are, however, more pointed at their extreme ends. The male organs are more developed than in any species figured by Yarrell.*

July 16, 1838. *Raia maculata* caught at Holywood, 33 inches long; the fish above described is, I suppose, a variety of this species; taken with lug-worm.

July 30, 1838. A specimen taken with lug-worm at Holywood is 2 feet long; on upper side greyish white, closely marked with dusky spots, and sparings with black spots, just as if a shower of ink had fallen on it. It is a male, the teeth sharp, no spines on under side, on upper side the usual series of spines towards the point of the pectorals, and also many spines near the margin of the body in a line with the eyes; like two last specimens, it is rough over the entire upper surface of the body from tail to head, but smooth in the contrary direction.

April 13, 1839. *Raia maculata*. I received from Holywood a male living specimen of this fish, the first Irish one I have seen that agreed with the important character attributed by Yarrell and Jenyns to the species, of being smooth above. This specimen was taken with the lug-worm (this is now in general use; in winter only, the Holywood fishermen state, will fish take the "buckie"); in its stomach were a shrimp, a *Portunus*, and a *Gunnellus vulgaris*. The specimen was 30 inches long and $20\frac{1}{2}$ broad; the ground colour above was a pale yellowish-grey, marked

* *Aug.* 26, 1840, I received a similar specimen taken by Mr. Getty at Rockport; it is smoother on the upper surface than any other I have seen, except the above; it is marked over with jet black markings, and, like the above, is the only ray I recollect having seen so coloured, as if a heavy shower of jet had fallen on it; it is preserved for Museum. The stomach was filled with the sea-mouse, *Aphrodita aculeata*, of which there were several specimens.

entirely over with minute spots of a dark grey colour; it agreed with every character Jenyns attributes to the species.

Oct. 14, 1839. Having examined the above specimen, I find the skin slightly roughened both above and beneath with minute tubercles, consequently it does not in a dry (as it did in a recent) state correspond with Yarr. and Jenyns' descriptions in this respect.

The Thornback, *Raia clavata*, Will.,

Is taken around the coast.

July 26*th*, 1838. I examined two female specimens, each about 3 feet in length, taken in Belfast Bay. They respectively contain eggs, varying from the size of a point to those in the horny cases ready for exclusion.

No. 1 has (excepting the spines on the ridge of the back) only two large tubercles on upper side, and a single rudimentary one at one eye: on under side it has four. Its stomach contained full-grown specimens of *Cancer velutinus*, *C. mænas*, and *C. Bernhardus*, a small *Modiola papuana*, $\frac{3}{4}$ inch long, and a *codling* 9 inches in length: this poor victim had a hook firmly grasped in its mouth, the line was cut just above the hook, so that little more than the hook (a very powerful one) remained.

No. 2 had, in addition to large spines on ridge of tail, two at one eye and three at the other; and one on each side, near the margin of the body, in a line with the 1st eye; besides these there were but two other tubercles on upper side, on under side four.

Teeth round in both, as figured in Yarrell, vol. ii. p. 416 [1st edition]. *Colour* of upper side in both a dirty brown of different shades, with large obscure whitish or paler spots and markings, and small black spots likewise scattered over it.

Aug. 8*th*, 1838. Two small specimens, about 14 inches long, that were brought to me, were beautifully marked all over with circular white spots, each surrounded by a narrow black ring.

Aug. 22*nd*, 1840. Received a *R. clavata*, about 20 inches long, taken at Bangor; it was filled with the slender-legged crab, *Stenorynchus Phalangium*.

Aug. 26*th*, 1840. Received four specimens (male and female), about 20 inches long, captured in Belfast Bay. One was filled with *shrimps*: another contained remains of brachyurous crustacea and two specimens of *Pandalus annulicornis*; a third, remains of specimens of *Stenorynchus Phalangium*, and other crabs; the fourth, remains of crustacea.

Mr. *Bernard Meenan* says this fish is the best liked of the rays for eating by *our* fishermen.* Rays will hardly sell in Belfast market, but there is another kind in Scotland better liked there: the fishermen keep all sp- of rays, when bait is scarce, for buckie-creels, cut off the tail, and take out the entrails, and hang the fish in the chimney to dry. Has seen some rays (sp. ?) 2 cwt., it requires two men to carry them: this applies to Carrickfergus, where the fishermen say they distinguish four kinds of ray, not including the Sting Ray.

The Sandy Ray, *Raia Radula*, Delar.,

Has been obtained on the N. E. and E. coast.

It was added to our Catal. by the Ordnance collectors, as noticed in my report on the Fauna of Ireland, and in Yarr. B. F., 2nd ed. vol. ii. p.

* Young or half-grown only eaten, the old ones are too tough or hard.

577. They obtained it on the N. E. coast. It was soon afterwards obtained on the Dublin coast, by Mr. M'Coy * and Dr. R. Ball. Captain Portlock also informed me that he had seen a specimen which was procured in Dublin Bay.

THE STING RAY, COMMON TRYGON, OR FIRE-FLAIRE, *Trygon pastinaca*, Cuv.,

Was stated by Templeton to be "occasionally taken on the coast."

Mr. *Bernard Meenan* says he has several times heard the Carrickfergus fishers speak of a fish like that figured by Yarrell, vol. ii. p. 588, and is pretty sure of having himself seen one.

In Smith's Cork, 1st ed. p. 305, the following note occurs:—

Pastinaca marina prima, Rond., Will. The Great Skate or Fire-Flare, Will. Tab., c. i. f. 4, proves this to be a true *Raia*.

The Cork Fauna includes *Trygon pastinaca*, on the authority of Smith's Cork, and probably erroneously.

Mr. Good informed Dr. R. Ball that a number of *Sting Rays* were taken at one haul of a traul-net, in the winter of 1846-7, on the Waterford coast.

THE EAGLE RAY, *Myliobatis aquila*, Cuv.?

Mr. M'Calla informed me that a large specimen of this fish was taken at Ardfry, in a bag-net set for salmon, but on my calling his attention to the specific characters, he stated his inability to determine the species.

THE HORNED RAY, *Cephaloptera Giorna*, Risso,

Has a place in the general British Catalogue, from a single individual taken on the southern coast of Ireland, the following notice of which was contributed by me to the Zool. Society, in 1835. See the Proceedings for that year.

"*Cephaloptera*, Dum. A fish of this singular genus, taken about 5 years ago on the southern coast of Ireland, and thence sent to the Royal Society of Dublin, is at present preserved in their Museum. In breadth it is about 45 inches. The specimen being imperfect, and the characters of some of the species being ill-defined, I hesitate applying to it a specific name. It somewhat resembles the *Ceph. Giorna*, as figured by Risso."

Mr. M'Coy having commented on the foregoing remarks, I made the following communication to the Annals Nat. Hist. vol. xx. p. 173:—

"In a 'Note on the Irish species of *Cephaloptera* (*Pterocephala*), by Frederick M'Coy, M. G. S. and N. H. S. D. &c.,' published in the Annals for March last (vol. xix. p. 176), the writer seems to consider that it is not the *Ceph. Giorna*, Risso, and recommends that the genus *Pterocephala*, into which it would come, should be adopted. He remarks that — 'On examining this very interesting specimen, I found that although obviously a *Pterocephala*, yet it presented most important differences from the *C. Giorna*, both in outline, proportions, shape of the fins, and form of the wing-like appendages to the head * * *; [it] seems referrible to that described many years ago * * * and figured by Lacepède under the name of *Raja Fabroniana*.'

"The writer then proceeds to point out in detail the various differences between *Cephaloptera Giorna* and *Raia Fabroniana*.

* It is the unnamed sp. of ray in his paper, in 6th vol. Ann. Nat. Hist., p. 405.

"Before publishing a notice of the Irish *Cephaloptera* in 1835, I referred to the *R. Fabroniana* of Lacepède, and considered the specimen as having about much the same resemblance to it as to the *C. Giorna*, but preferred adopting the latter name. Müller and Henle, in their great work on the 'Plagiostomen,' the highest authority extant on the subject (published in 1841), brought the two names together as representing but one species, and adopted for it Risso's term, *Cephaloptera Giorna*. The Prince Bonaparte has done the same in his Catalogo Metodico dei Pesci Europei, published at Naples in 1846. If therefore I have been the means of the specimen being 'erroneously referred to in most works on British Zoology,' I err in company with the two best authorities in Europe; and, if I be correct, I am indebted to the writer of the 'Note, &c.,' under consideration, for providing by his description and figure better means than I had myself done of proving the correctness of my opinion respecting the species in question.

"The specimen was so imperfect, and in addition so distorted by the preserver, that, although in possession of an accurate drawing of it previous to publishing the note in 1835, I was unwilling to have it engraved. The relative dimensions being, for the same reasons, necessarily inaccurate, I abstained also from giving them."

For description of the following species recorded by Professor M'Coy, see Annals Nat. History, vol. vi.

Raia radiata, Starry Ray, p. 405.

Raia intermedia, p. 405.

Raia microcellata, p. 407.

ORDER IX.—CYCLOSTOMI.

The Lamprey, *Petromyzon marinus*, Linn.,

Is taken in suitable localities in all quarters of the island.

In the larger rivers connected with L. Neagh it is of regular occurrence.

A fisherman told me it is common in the Coagh, or Ballinderry river, of five pounds' weight. He had seen some which he believed to be ten or twelve pounds; he says when "rooting" they turn over stones (by sheer strength, not by suction) of ten to twelve lbs. weight. They go up this river not only as far as Coagh, about five miles from Lough Neagh, but four or five miles further. The people here would not use them for any consideration; they are so ugly. Newcastle, County Down, Nov. 2nd, 1851. A fisherman informs me that he once, about two years ago, caught four lampreys, the largest of which was eleven inches long, in the tidal river here, a considerable way above the bridge. He had not seen or heard of them here before. Two persons who rent the fishing of the river had never seen lamprey in it.

May 23rd, 1851. *Petromyzon marinus*. A fine adult fish of this species 2 feet 6 inches long, and in very good condition, taken this evening in Conswater, Belfast, was brought me before it was dead. It was seen with its dorsal fin above the surface of the water, where about 4 feet deep, and was struck by a fisherman under the impression that it was a mullet.

The old man who brought it to me says he has been fishing "all his life" in the bay, and never saw a fish of this kind before. On questioning him particularly about its being at the surface of the water, with the fin appearing above, he stated that it positively was so. He imagines that the "surging of the boat" may have made it rise to the top of the water.

May 15th, 1849. A specimen which I saw with Dr. R. Ball was taken to-day at the Pigeon House, Dublin Bay. One was obtained from the Liffey a few years ago, by Dr. B. He has not observed this species at Youghal.

Several correspondents have favoured me with notes of the occurrence of the lamprey in the Shannon. The Rev. Charles Mayne of Killaloe informed me in 1838 that they are seen there from about 10th of June to the end of that month, but not afterwards; weight from 1 to 3 lbs.; price from 5*d.* to 10*d.* per couple.

In *Tighe's Kilkenny* (p. 156) it is remarked:—"Lampreys, which are often taken, and justly esteemed as a delicacy in many other places, are constantly thrown away by the fishermen, and not even kept as bait."

They are not brought to Belfast market.

Mr. *M'Calla* supplied the following note, in *Sept.*, 1840. "Lampreys (but I don't know what sp.) are found in L. Corrib, and several of the streams that run into it." Those in the streams running *in*, except about their mouths, are probably of the smaller species.

In 1838, Captain Fayrer sent me from Portpatrick a small specimen about 6 inches long, which was taken adhering to the back of a cod-fish.

THE LAMPERN, OR RIVER LAMPREY, *Petromyzon fluviatilis*, Linn.,

Is found from North to South of the island.

Found adhering to other fishes and devouring them.

I was anxious to get a specimen of this fish from Lough Neagh, for the purpose of ascertaining whether it was this sp. or small individuals of the *P. marinus*, which latter is known to attack other fishes in the manner described, and eventually was successful in *Sept.*, 1843, when Mr. Hyndman obtained in a fishing boat at L. Neagh a *P. fluviatilis*, about a foot in length, which he was told was taken adhering to a large trout: he brought me this lamprey.

In a large deep pond made for gold-fish at the Falls, near Belfast, a portion of the surface of which was covered with the leaves of the White Water Lily, I observed, on a warm day in summer, an extraordinary appearance, caused, as I believed, by this species. To the under surface of each floating leaf of the plant several (in some instances so many as a dozen) lampreys, about a foot in length, the adult size of this sp., attached themselves by the mouth, while the wriggling of their dangling bodies had a strange effect. They were too far from the edge to be captured by any available means, but I have no doubt that they were all full-grown individuals of this species.

Dr. Ball obtained a specimen about 10 inches long, taken in the sea, at Youghal. Robert Callwell, Esq., captured one, on 1st April, 1835, in a river flowing into Glendalough, County Wicklow. I have examined the two specimens last referred to.

The Fringed-lipped Lampern, or Planer's Lamprey, *Petromyzon Planeri*, Bloch,

Is found from North to South.

The first examples which came under my notice were obtained by Dr. R. Ball, in 1836, from the neighbourhood of Naas, Co. of Kildare, as recorded by me in the Zool. Proc., 1837, and also in the following notice which I contributed to the Annals Nat. Hist., vol. ii. :—

"*Petromyzon Planeri*, Cuv. Fringed-lipped Lamprey.—I am indebted to Dr. Ball for two specimens of this fish, which were obtained in the vicinity of Naas, County of Kildare. They are $4\frac{1}{2}$ and 5 inches in length respectively; the smaller one only has the 'anal sheath,' which is 2 lines long. (See fig. in Yarr. B. F., vol. ii. p. 457.) The dentition in these specimens is similar to that shown in Mr. Yarrell's figure of *P. fluviatilis*, and consequently in this character they do not accord with his figure of the mouth of *P. Planeri;* in this same wood-cut, however, the chief peculiarity of the species—the fringed lip—is well represented. The dentition, or 'armature of the mouth,' of *P. fluviatilis* and *P. Planeri*, is similar, as remarked by Mr. Jenyns.*

"*April* 2, 1838. From the Rev. Charles Mayne, Vicar-General of Cashel—to whose kindness I have in several instances been indebted for specimens of fishes, &c., from the river Shannon—I to-day received a lamprey, $4\frac{3}{4}$ inches in length, recently taken in the vicinity of Killaloe, and which proved to be the *P. Planeri*."

I have only to add that specimens have since been taken in some of the Northern Counties, and that this species is more common than *P. fluviatilis.* †

The Pride, Sand Pride, or Mud Lamprey, *Ammocœtes branchialis*, Cuv.,

Is found from North to South of the island.

The first native specimens of this fish which came under my notice were two sent me alive by Dr. R. Ball, in Jan., 1833, and referred to in the contribution which I made to the Zool. Proc. of that year. They were taken at Ballitore, County Kildare, where he first observed the species, under the circumstances mentioned in the following extract from a letter which I received from him shortly before the arrival of the specimens:—

"*Ammocœtes branchialis.* I have no specimen, but will endeavour to procure one. When at school at Ballitore, in 1817, and in pursuit of fresh-water cray-fish, I many times captured what we (boys) called 'lamper eels;' they were certainly not either of the species called lampreys, and I have no doubt of their having been the *A. branchialis.* They agreed precisely (so far as memory can serve) with the account in Fleming. They frequented mill-races and small streams, used to conceal themselves, when pursued, in mud or gravel, were generally seen under shelter of a stone from the current, maintaining themselves in constant vibratory motion in the same spot, I would almost say for weeks together, having known places where I was always certain of being able

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* Dublin, June, 1838.—Specimens of this lamprey have lately been received by Dr. Ball, from Inch river, about ten miles North-West of Youghal.

† In a small stream running into the Blackstaff river, about two miles from Belfast, specimens of this species were captured in the spring of 1853, by Mr. Penrose Beale, of Belfast. These specimens were seen by us in a living state.—Ed.

to see the creature; its extreme agility, when taken from the water, seemed to justify the old saying, 'as merry as a grig.'

On 5th March, 1835, I made the following note in reference to the living specimens received from Dr. Ball:—

"The two lampreys received by me on Feb. 2nd (and which had been taken from their native brook a few days previous to the 19th Jan.) I put into the vase with a pair of gold-fishes. The latter seemed to express their fear by throwing their dorsal fins into the most rigid position, so that every ray seemed perpendicularly upright, and during the short time that the lampreys continued their gambols, the gold-fishes kept close together; they soon perceived, however, that the lampreys did not attempt to molest them, and they did not afterwards regard them.

"The two species continued together for two or three weeks, the lampreys never *for a moment* intentionally molesting their more brilliant companions, though in their gambols they would occasionally dash against them, apparently through a deficiency or total want of sight, as they did against objects of every description placed within the range of their evolutions.

"These evolutions are always similar, the fishes dashing violently from the bottom of the vase with a rapid wriggling motion to the surface of the water and back to the bottom again obliquely, and thus continuing for a short time, although apparently as long as they have the power; for in the midst of their most lively motions they seem as if suddenly paralyzed; they invariably fall in a seemingly senseless manner to the bottom, and whether they alight on back, belly, or sides, it is indifferent to them, as they continue to remain in whatever position their body reaches the bottom, until roused again to activity, which sometimes does not occur for considerable time.

"I should be rather disposed to question the assumption, that the Pride adheres to the branchiæ of fishes, as some authors imagine; during the period already mentioned, my specimens did not attempt doing so with the gold-fishes."

March 1. *Ammocœtes branchialis.* The specimen in spirits agrees precisely with Fleming's description of this species.

With the fig. of *Petromyzon cœcus* (ray) by Couch (Mag. Nat. Hist. vol. v. p. 23) it agrees, excepting that the lip is too much rounded in the fig. and the tail not lanceolate, as it is in the specimen. I cannot distinguish any teeth, as are described in the mud lamprey, my specimen having what seems to be mere papillæ. In other particulars it agrees with Couch's description; my specimen is certainly the Pride as described by Pennant; his fig. is very bad.

Nov., 1842. Mr. E. Waller sent me an example of the Pride, from a tributary of the river Blackwater, which empties itself into L. Neagh.

Mr. Templeton mentioned this species in his Catalogue, and Dr. R. Ball notes it as occurring at Dublin and Youghal.

The Myxine, Glutinous Hag, or Borer, *Myxine glutinosa*, Linn., *Gastrobranchus cœcus*, Bloch,

Is only known to me from its being mentioned by M'Skimmin in his History of Carrickfergus, and by Mr. Templeton in his Catalogue, where the following note occurs:—

"*Myxine* (Linn.), *glutinosa* Linn., has been found at Carrickfergus."

Mr. H. D. Goodsir informed me, in 1844, that the Myxine is captured on the muddy banks on both sides of the May, in the Firth of Forth, by fishermen engaged in fishing for *Gadidæ;* one which he gave me was taken on a hook, still in its mouth.

THE LANCELET, *Amphioxus lanceolatus*, Yarrell,

Has been obtained on the South coast, as noticed by me in the 18th vol. of the Ann. Nat. Hist. (1846):—

"Lancelet, *Amphioxus lanceolatus*, Pallas (sp.); Yarr. Brit. Fishes.—

"Three specimens of this extraordinary fish with which I have been favoured were dredged on sand from a depth of forty-five fathoms off Cape Clear, in the month of May last, by Mr. MacAndrew, whose successful dredging exploits are so well known. This gentleman, writing from Liverpool in August, 1846, gave me the following interesting particulars of the lancelet:—'The first time I obtained this species was early in Sept., 1843, in Kilbrannan Sound, West Clyde—forty to fifty fathoms; muddy sand: the specimens were of large size, about double that described by Yarrell, and appeared to possess some peculiarities. One was placed in the hands of Mr. Goodsir, and the other deposited in the Museum of the Royal Institution, Liverpool. At the end of April, 1845, specimens were procured off Mount's Bay, Cornwall, in about thirty fathoms; and West of Scilly, forty-five fathoms in clean sand. It is by no means rare on the Cornish coast, as on two or three occasions I found as many as five in my dredge at once."

Mr. MacAndrew afterwards found several living lancelets at Bantry Bay, among sand dredged from shallow water for manure, early in June, 1848.

MOLLUSCA.

CLASS CEPHALOPODA.

Genus SEPIA.

S. officinalis, Linn.,

August 23rd, 1836,—Mr. Brown of Dundrum states, is occasionally taken here, and called cat-fish—the "bone" is called may-shell, and is much valued by the country people, as of old, for its medicinal uses.

A mutilated specimen was found at Queen's Bridge, Belfast, in July, 1850.

"Bones of this species have been washed ashore at Larne."—Ord. Sur. L. Derry. Notices, p. 15.

S. rupellaria, Fer.

Three specimens of the dorsal plate were found at Magilligan by Mr. Hyndman.

Genus LOLIGO.

L. vulgaris, Lam.

"*Loligo vulgaris*, Calamary; Ordnance Survey of Londonderry:—Great Cuttle of Pennant, taken in the Culmore net." P. 16.

Common at Dublin, Dr. Ball. A full-sized one, as accurately described to me, was found at Newcastle (Oct. 19th, 1851), and the only one an acute fisherman living here ever saw.

Loligo vulgaris. Dec. 20th, 1848.

A full-grown specimen found on the beach, Dundrum (County Down), was received at the Museum—perhaps thrown ashore by the hurricane of the 15th; it was alive on the 19th, when brought to Dundrum.

L. sagittata, Lam.* Glendore, Aug., 1838.

About one hundred were seen by Prof. Allman in Glendore Bay, the only time he ever met with them. He describes their change of colour as very beautiful, until they threw out the ink and obscured themselves, though they did not entirely so conceal themselves in the sea. About a dozen put into a pail of sea-water, containing 5 or 6 gallons, threw out as much ink as to conceal themselves. The spots which, now confluent, give a purple colour to the body were invisible before Mr. A. put them alive into spirits, when they immediately were brought out—though, when allowed to die out of spirits, the spots never appeared afterwards, though they were introduced into spirits. Dublin, Note, Nov., 1839.

* Forbes and Hanley considered this to be *L. Todarus*.

Loligo subulata, Fer. See Ball, in R. I. A. Proceedings, 1839, p. 364, under *L. media var.* (?) January 10th, 1842.

July 7th, 1847.—Dr. R. Ball, writing to me from Bray, stated, "I have just caught here the *Loligo subulata*, identical with yours from Down; I do not know whether on rigid examination it will prove a species distinct from *L. media*." *L. subulata*, Lam., is made synonymous with *Sepia media*, Linn., in Lam., vol. xi. 368. *L. subulata*, Fer. and D' Orb., is not referred to, though this vol. of Lamarck was published in 1845.

"Specimens occasionally received from Dublin Harbour, Strangford Lough, and other inlets." Templeton, MSS. (W. T. in A. N. H. vol. v. p. 10.)

L. marmoræ, Verany.

Taken in the sprat-nets in summer, at Youghal. Miss M. Ball.

L. Eblanæ, Ball.

March 13th, 1845.—I received a specimen from Bangor; this, as well as the Carrickfergus specimen, was much larger than that described by Dr. Ball. Dublin, Dr. Ball.

Dec. 6th, 1848.—A specimen found on the beach, Holywood, Belfast Bay, presented to the Museum. It is a beautiful fresh specimen, of a pinkish flesh-colour, beautifully and regularly dotted over with minute reddish-brown spots. Body from mouth to extremity 5 inches long.

Genus OCTOPUS.

O. vulgaris, Lam. Not uncommon. Temp. MSS.

[Probably the following species is meant. *R. Ball.*]

Genus ELEDONE.

E. Octopodia, Penn. *O. cirrhosus*, Lam.

Four procured in 1836, near the entrance of Lough Foyle, one in 1837, and one near Carnlough, Sept., 1837, Ord. Sur. L. Derry, Notices, p. 15.

Not unfrequent in Belfast Bay. Within a dead univalve shell, from 20 fathoms at the entrance of Belfast Bay (shelly sand), Oct. 3rd, 1846, by Mr. Hyndman and Mr. E. Getty, who brought it to me alive. It lived in sea-water for about two days, and climbed up the sides of the glass bottle in which it was kept with facility.* Cast on the shore at Youghal in great numbers after a snow-storm in 1838. Sometimes brought in by fishermen, who use them for bait; called *squid* by them. Miss M. Ball, West-port, Nov. 26th, 1843. *R. Ball.*

Genus SEPIOLA.

S. Rondeletii, Risso.

Several obtained in Lough Foyle (Ord. Sur. L. Derry, Notices, p. 15), Belfast Bay, Dundrum, Newcastle.

S. Atlantica, D' Orb.

Bangor, Belfast Bay, Dr. Drummond.

* This specimen was inside a *Buccinum undatum* when taken. The contents of the trawl being emptied on the deck for examination, the cuttle-fish was observed crawling out, but when an attempt was made to take it, it immediately retreated inside its habitation, where it was so completely concealed that it would otherwise have escaped notice.—*G. C. H.*

Genus ROSSIA.

R. Owenii, Ball.

Dublin Bay, Dr. Ball.

R. Jacobi, Ball.

Belfast Bay, Mr. J. Grainger. Dublin Bay, Dr. Jacob.

Genus SPIRULA.

S. Australis, Flem.

"White House, Belfast Bay, Portrush. Templeton, MSS." Magilligan, Mr. Hyndman; Youghal, Dr. Ball; Clare, Professor Harvey.

CLASS PTEROPODA.

Genus HYALÆA.

H. trispinosa, Cuv.

An individual of this species, and the first *Pteropod*, I believe, that has occurred on the British shores, was found by Dr. R. Ball on the coast near Youghal, some years ago. At the same time *Spirulæ* and *Ianthinæ* occurred, but none of them in a living state.

Genus PERACLE.

P. Flemingii, Forbes.

In shell-sand, Bundoran, Mrs. Handcock. Dredged off Mizen Head, Mr. M'Andrew. South Island of Arran, Mr. Barlee.

CLASS GASTEROPODA.

ORDER NUCLEOBRANCHIATA.

Genus SAGITTA.*

S. Britannica, Forbes.

Coast of Cork, Professor Allman.

MOLLUSCA NUDIBRANCHIA, Cuv.

Genus DORIS.

D. tuberculata, Cuv.

In the late Mr. Templeton's Journal, "*Doris Argo*, Penn., Brit. Zool., p. 22," is mentioned as twice found by him in 1812, on the shore towards the entrance of Belfast Bay; and Dr. J. L. Drummond informs me, that about the same time he procured a *Doris* here, equalling a hen's egg in size, and which he considered to be of this species. At Youghal (County Cork) it has been taken by Dr. Ball, and to this gentleman and myself has occurred at the island of Ireland's Eye, off the Dublin coast. Professor Allman has favoured me with specimens procured by him at Courtmasherry harbour, County of Cork, where he states that the species is common. The Irish specimens I have seen were generally straw-co-

* Now separated from Mollusca.—ED.

loured. In one of them the anterior portion of the foot was margined with a line or band of a fine blue colour.

D. repanda.

Alder and Hancock. Annals Nat. Hist. vol. ix. p. 32. A specimen of this *Doris* was found between tide-marks at Roundstone, County Galway, in July, 1840. Dr. Ball, Prof. E. Forbes. W. T.

D. bilamellata, Linn.

I have obtained this between tide-marks, at the island of Lambay, off the Dublin coast, and by dredging in about ten fathom water, in Belfast Bay. A specimen which was particularly examined was found to agree with Dr. Fleming's description of *D. verrucosa* in the number of branchial processes, which are 24, and in their arrangement being somewhat "semicircular," in a broadly horse-shoe form, thus . In Dr. Johnston's specimens the branchial processes seemed "not much to exceed twelve," and were disposed in an "uninterrupted circle." Annals, vol. i. p. 55. Although the precise number of these organs is of no specific value, the difference alluded to is so great as to be worthy of attention. In a specimen from Newhaven, near Edinburgh, favoured me by Professor E. Forbes, these processes are twenty in number.

D. affinis, Thompson.

Body elongated, equally rounded at both ends, depressed, above closely studded with stout prolonged tubercles, orifices of tentacula without sheaths; branchial processes short, numerous, pinnate.

Length $1\frac{1}{4}$ inch, breadth equal to half the length: of a very pale straw colour; tentacula without sheaths, short, lamellate, in all respects resembling those of *D. tuberculata*; cloak covered with long stout tubercles varying in size, the largest along the sides, and $\frac{3}{4}$ of a line in height, generally of equal breadth throughout, but occasionally expanding towards the end, which terminates in a mass or fasciculus of spicula, conspicuous under a low power of the lens, and giving to them the appearance of a spinous armature; margin of the cloak moderately broad, its under surface granulated; space between it and the foot, and also this latter, smooth; branchiæ short, pectinate, about 18 in number, disposed in a broadly horse-shoe form, as in *D. bilamellata*, and the space within them likewise covered with tubercles.

This *Doris* approaches *D. bilamellata* more nearly than any other British species, and would perhaps be regarded by some authors as only a variety of it; for this reason I have named it *affinis*, to mark that as a species it may be viewed with some suspicion. Compared with *D. bilamellata*, the *D. affinis* has more solidity, is somewhat more depressed, its outline of body less elegant, margin of the cloak narrower, tentacula and branchiæ apparently less developed, and instead of the pretty rounded termination which the tubercles of *D. bilamellata* generally present are fasciculi of spicula, and these not so tastefully disposed over the surface of the cloak as in that species: in all respects it is a less attractive animal.

In the month of December, 1837, I obtained three specimens of this *Doris* from among oysters dredged at Greencastle, County of Londonderry.

D. Ulidiana, Thompson.

On the 17th of February, 1840, I procured three specimens of this *Doris*

among oysters brought to Belfast market from the neighbouring coast of Down or Antrim, and after noting their general appearance, colour, &c., set them apart as species unknown at least to the British Fauna. Mr. Alder having some time ago expressed a wish to see my collection of Nudibranchiate Mollusca, it was placed in his hands, and, on this species coming under examination, it was considered by him and Mr. Hancock to be new, and a description of it drawn up for their own use was kindly communicated to me. This is as follows;—within parentheses are my notes on the colour of the living *Doris*.

Doris Ulidiana. — "Length, from spirits, ½ inch, breadth ¼ inch; ovate-oblong, rather straight at the sides, depressed [of a uniform pale yellow, the intestines appearing through the skin of a dark colour]. Cloak not extending much beyond the foot, rough with spicula, and covered with large, unequal, obtuse tubercles, the spicula collected in bundles in the tubercles and radiating at their base. Tentacula [long and whitish] lamellated, without sheaths; the edges of the apertures plain. Branchiæ consisting of eleven [beautifully white] pinnated plumes, set in a semicircle round the anus. Foot rather broad. Veil above the mouth semicircular."

On being put in diluted spirits of wine, the tentacula were entirely withdrawn, and the branchial processes lost their beauty by discoloration, which changed them to the same hue as that of the body.

On comparing these specimens at the time they were procured with the most nearly allied species in my possession, the *Doris muricata*, Müller (Zool. Dan.), they were noted down as being certainly distinct from it:—in being of a more elongate shape, in having the tubercles differently formed, and, in proportion to the dimensions of the body, their being not more than half the size of those of *D. muricata*. Messrs. Alder and Hancock made the following comparative observations: "Comparing your *D. muricata* [a species they had not seen before] with our *D. aspera* and your *D. Ulidiana*, we come to the conclusion, so far as we can judge from specimens in spirits, that these three are distinct, though nearly allied, species. *D. Ulidiana* differs from *D. muricata* in its much larger size, and longer and more depressed form. The tubercles appear to be more depressed, and the branchial plumes larger. From *D. aspera* it differs also in size and shape; in having larger tubercles, the cloak narrower, and the foot broader."

D. obvelata, Johnston.

Mr. Hyndman procured a specimen of this *Doris* on *Fuci* at Skerries, Dublin coast. On its being submitted to the inspection of Mr. Alder, by whom the original specimen described by Dr. Johnston was discovered in Berwick Bay, he remarked that the species "appears to be pretty generally diffused, but nowhere common." He had obtained it last summer in Rothesay Bay.

Doris muricata, Mull.

I have not unfrequently taken this minute species when dredging (accompanied by Mr. Hyndman) in the loughs of Strangford and Belfast; it was generally adhering to the leaves of tangle (*Laminaria digitata*). Muller describes it as 5 lines long by 3 broad: my specimens were all even under this size. The *D. muricata* has hitherto been unnoticed in the British seas.

D. aspera, Ald. and Hanc.

Very young examples of a *Doris*, and most probably (according to Mr.

Alder) of this species, were obtained at Glandore Bay, County of Cork, by Professor Allman, in the month of August, 1842. Mr. Alder himself procured specimens of *D. aspera*, during an excursion with Dr. Farran of Dublin to Malahide, on the coast of Dublin.

Doris pilosa, Mull.

The first Irish specimen of this *Doris* that I have seen was found in Dublin Bay, by Professor Allman, to whom I am indebted for it; subsequently two individuals were taken by Dr. J. L. Drummond, when dredging in the month of June in Belfast Bay.

D. sublævis, mihi.

D. convex, broadly ovate, smooth, basal sheaths to the tentacula, foot broad, branchial filaments 8, long and finely plumose.

Length of specimen (from spirits) 7 lines; height equal to about half the length; breadth 4½ lines; margin of cloak narrow; foot of nearly equal breadth throughout; tentacula long and acuminated. *Colour* white.

In being smooth, this species agrees with the *D. lævis*, Linn., Mull. Z. D. vol. ii. p. 9, tab. 47, figs. 3—5, but differs much in its convexity and in the breadth of the foot, which is represented very narrow in that species.

Dredged in Belfast Bay by Mr. Hyndman, September, 1835.

Genus GONIODORIS.

G. elongata, mihi.

G. elongated, narrow; a row of papillæ on each side the back; branchial filaments about 10, plumose.

Length of specimen (from spirits) 3 lines; breadth 1 line; height ¾ line; breadth of body equal throughout.

This species resembles in form the *D. gracilis* and *D. pallens* of Rapp. Nova Acta, vol. xiii. part 2, p. 522, tab. 27, figs. 9 and 10.

I obtained this mollusk in June, 1838, between tide-marks, at the island of Lambay, off the Dublin coast.

G. nodosa, Mont.

Twelve specimens of *G. nodosa* occurred on a plant of *Fucus vesiculosus*, dredged in Killery Bay, County of Galway, in July, 1840. Dr. Ball, Professor E. Forbes, G. C. Hyndman.—W. T. Mr. Alder found the species to be plentiful at Malahide in September last.

Var. G.—*D. Barvicensis*, Johnst.

I have been favoured by Professor Allman with specimens of this *Doris*, of which he procured about a dozen in Courtmasherry Harbour, in the months of August and September, 1838. They were all found among the roots of *Laminaria digitata* cast ashore, and, being alive, a minute description of them, as observed in this state, was drawn up by Professor Allman. In all details except the following these individuals agreed with those described by Dr. Johnston in the Annals:—Slightly elevated white tubercles, chiefly disposed in straight lines, appeared on the sides of the body; 9 branchial leaflets; in the several specimens examined these do not encircle the vent, but are wanting for the space of ¼ of a circle posteriorly, two hinder leaflets shortest.

Genus POLYCERA.

P. quadrilineata, Mull.

Frontal processes of the mantle 4; angles of the foot produced; pair of branchial lobes rather small.

Length of specimen (from spirits) 3 lines; body broadly truncate anteriorly, tapering to the tail; tentacula lamellated; 3 branchial filaments; eyes two, at the inner side of the posterior base of the tentacula. *Colour* whitish, with the frontal processes of an orange-yellow; a few scattered dots of this colour on the mantle.

Although the four black lines described by Muller as extending in an interrupted manner along the body of *P. quadrilineata* are entirely wanting in my specimens, I cannot, possessing as they do every other character in common with it, regard them as of a different species. They are at the same time quite distinct from the supposed varieties of *P. quadrilineata* figured in table 138 of the Zoologia Danica.

Three individuals of this species occurred to us on the same occasion as the *Tritonia lactea*, when dredging at the entrance of Strangford Lough; they were adhering to *Laminaria digitata*. When placed in a phial of sea-water, they were generally to be seen suspended by their threads from the surface, the body at the same time moving freely about with much grace. This species has hitherto been unnoticed in the British seas.

P. typica, mihi.

P. with 4 frontal appendages, tapering towards the point; tentacula lamellate; branchial lobes very large.

Length 5 lines; body narrow; tail tapering; branchial filaments elongated, in a tuft anterior to the lobes; disk thin and flexible at the edges. *Colour* whitish, tentacula and branchial lobes tipped with yellow; back and sides thinly studded with tubercles (spots?) of a yellow colour, three of which are in the middle of the back, and six or seven close to the tuft of branchial filaments; the intestines (seen through the skin) of a dark colour.

Of this well-marked species, two individuals were dredged in Strangford Lough by Mr. Hyndman and myself, in January, 1835, at the same time with *Euplocamus plumosus*. They seemed partial to coming to the surface of the water in which they were for some time kept, and to moving along with the foot upwards.

P. ocellata, Ald. and Hanc.

Mr. Alder, by means of the dredge, took this species commonly, and of all sizes, in Dublin Bay, in August last, and subsequently obtained a specimen at Malahide.

P. citrina, Alder.

Mr. Alder dredged two or three specimens of this species in Dublin Bay, at the same time with the last.

P. cristata, Alder.

Obtained with the preceding two species: common.

Genus ÆGIRUS.

Æ. punctilucens, D'Orbigny.

Professor Allman obtained this *Polycera* in a pool at Courtmasherry Harbour, County Cork.

Genus EUPLOCAMUS.

E. claviger, Mull. sp.

Body elongated, tapering to the tail; three plumose branchial filaments.

Length 10 lines; mouth "sub-inferior, terminal;" frontal appendages the two central very small; 3 beautifully plumose branchial filaments situated at about two-thirds the length of the body from the head; mantle separated from the disk by a deep channel; edge of cloak thin and waved; no eyes apparent; lateral appendages 9 on each side, terminated by disks. *Colour*, body white, tail orange, clavate, tips of the processes surrounding the body orange, as are those of the frontal appendages and tentacula; branchial filaments orange; on the back are a number of papillæ of this colour, as is likewise a line of spots along each side between the cloak and foot.

The gliding motion of this beautiful species along the bottom of the vessel in which it was placed for examination was regular and graceful.

It was dredged in Strangford Lough, adhering to a *Laminaria*, by Mr. Hyndman and myself, in January, 1835. Lahinch, Co. Clare.

Genus TRITONIA, Cuvier.

T. Hombergi, Cuv., Johnst. Ann. Nat. Hist., vol. i. p. 114, pl. 3, figs. 1 and 2.

A specimen about 4 inches in length, with the examination of which I have been favoured by Dr. Ball, was found, some years ago, with oysters, at Howth, County Dublin.

T. plebeia, Johnst.

A specimen was taken by dredging in Cork Harbour, August, 1843.—Dr. Ball and Professor Forbes.

T. lactea, mihi.

T. of a milk-white colour, with 6 large branchial appendages on each side, bifid and ramosely pinnate; mantle terminating anteriorly in 4 arborescent processes.

Length of specimen (from spirits) 8 lines; sheaths of the tentacula deeply fimbriated. Colour milk-white; but with the aid of a lens a few very minute scarlet dots are seen scattered over parts of the body and the branchial appendages.

The specimen occurred to me when dredging at the entrance of Strangford Lough, in the month of October, in company with Mr. Hyndman.

T. arborescens, Cuv.

Several specimens of a small size were taken by Mr. Alder and Dr. Farran at Malahide. *Tritonia lactea*, Ann. Nat. Hist., vol. v. p. 88, pl. 2, f. 3, is considered by Mr. Alder a variety of *T. arborescens*.

Genus MELIBŒA.

M. fragilis, Forbes.

Three examples of this species were taken on *Antennularia antennina*, dredged in Clew Bay (Co. Mayo) by Dr. Ball, Prof. Forbes, and Mr. Hyndman.

M. coronata, Johnst.

Obtained at Glandore Bay, County Cork, in August, 1842, by Prof. Allman, and subsequently in Dublin Bay by Mr. Alder, who is now of opinion that the *Melib. ornata*, Ann. Nat. Hist., vol. ix. p. 33, is a variety of *M. coronata*.

In *Sept.*, 1851, this species was dredged in 35 fathoms, off the Copeland Islands, by Mr. Hyndman. Its spawn was got at the same time, adhering to *Sertularia abietina*.

Genus CALLIOPÆA.

C. bifida, Mont.

An individual of this species, taken by Mr. Getty and Mr. Hyndman when dredging in Belfast Bay, was brought to me. It agrees critically with Montagu's description, except in the following points. There are just twelve appendages on each side, three of which are larger than the rest, but placed at unequal distances from each other on both sides, and not opposite, as shown in Montagu's figure. The colour is better defined than in the figure; the marginal line, whence the appendages issue, is strongly marked and reddish, as they likewise are; foot plain flesh-colour.

The animal is extremely agile, and, *planaria*-like, is one moment twice the length it is the next; it often moves about with the foot upwards, and in its motion several times had the long tail thrown quite under the head.

Genus EOLIS.

E. papillosa, Johnst.

Of this fine species, three individuals were found by Dr. Lloyd (of Malahide) and myself, under stones at Lambay Island, on the 1st of June; at the same time their spawn, just as described and figured by Dr. Johnston in Mag. N. H. as above-cited, was obtained. One of these animals examined critically had 25 lateral rows of branchial processes, and about 12 of these to each row.

E. Zetlandica, Forbes.

July 29th, 1840.—This species was taken by Professor Forbes and myself, between tide-marks, at Lahinch, County Clare.

E. Cuvierii.

Among the *Nudibranchia* which I owe to the kindness of Professor Allman, was a small individual of this species, taken by him at Courtmasherry Harbour, in the autumn of 1838.

E. coronata, Forbes.

At Glandore Bay, found to be common at Malahide, by Mr. Alder and Dr. Farran.

E. pallida, Ald. and Hanc.

A single example taken at Malahide with the preceding.

E. alba, Ald. and Hanc.

Dublin Bay, Messrs. Alder and Hancock.

E. Farrani, Alder and Hancock.

Dredged at Malahide, Messrs. Alder and Farran.

E. violacea, Alder and Hancock.

Mr. Hyndman, when dredging on the 26th August last, off Castle Chichester, Belfast Bay, in 6 to 10 fathoms water, captured a specimen of this very beautiful *Eolis*. It was brought to me alive, and immediately afterwards despatched by post in a phial of sea-water to Newcastle, for Mr. Alder's examination in a living state, but on reaching its destination was unfortunately dead. Mr. Alder remarked, that it was a very fine example of his *E. violacea*, which was described from a Cullercoats specimen smaller and less perfect than this had been.

E. Drummondi.

The first specimen of this *Eolis* that I am aware of being taken on the Irish coast, occurred to myself at Newcastle, County Down, in August, 1836, but, besides its careful preservation in spirits, no attention was bestowed upon it. In June last a considerable number of individuals of this species were taken in the dredge near Bangor (County Down) by Dr. J. L. Drummond, who, being unacquainted with them, at once drew up a very minute and excellent description from the living animals, illustrating it at the same time with several sketches. Under the head of "general observations," it is remarked in Dr. Drummond's journal:—"Animal either very active and coursing repeatedly round the basin, or hanging by its disk applied to the surface of the water. Touch very acute, the tentacula and cirri shrinking at the slightest application of a foreign body. On killing a specimen by keeping it some time in fresh-water, the cirri every one dropped off on the slightest touch."* Some of these specimens (from spirits) are of large size, several being 9½ and 10 lines in length. In the disposition and length of the branchial filaments there is great diversity; in one individual these filaments are as long as its entire body, or 7 lines in length; in another of equal size they are half the length of its body; in some they are conspicuously in fasciculi; in others they appear to be in a continuous row; none, however, exhibit filaments of a clavate form like those of the *Doris pedata* of Montagu (see Johnston in Annals above-cited); they are generally pointed.†

To the kindness of Edmund Getty, Esq., I owe the results of a day's dredging in Belfast Bay, among which was a mollusc of this species.

Genus PROCTONOTUS.

P. mucroniferus, Ald. and Hanc.

On a sponge in shallow water, at Malahide.

Genus ALDERIA.

A. amphibia, All.

In salt marshes, Skibbereen, County Cork; Professor Allman.

Genus IDALIA.

I. aspersa, Ald. and Hanc.

One of this species, hitherto only known from a single individual procured on the coast of Northumberland by the authors referred to, was dredged in about seven fathoms water, off Bray Head (County of Wicklow), by Dr. Ball. When living it is said to have been somewhat of a dull rosy hue. The specimen is now (probably being contracted in spirits) five lines in length; it was submitted to Mr. Alder's inspection.

* Mr. R. Patterson, who accompanied Dr. Drummond on the occasion, favours me with the following note: "To avoid this, I took a number of living specimens, and, by the successive addition of some table salt, converted the sea-water into pretty strong brine. While doing so, the motions of the animal became gradually more feeble, and then ceased. The branchiæ did not appear detached, and the specimens were placed in a bottle along with the brine in which they had been killed. The result was, however, the same; they separated as much as if the shock from fresh-water had still been sustained, and the liquid became so fœtid and discoloured (perhaps from the presence of too much animal matter) that the entire contents of the bottle were thrown away."

† Nevertheless I cannot but think that *D. pedata* is identical with the species under consideration.

CLASS GASTEROPODA.

ORDER INFEROBRANCHIATA.

Genus PLEUROBRANCHUS.

"*P. plumula*, Malbay, County Clare, very rare," Prof. Harvey.

P. membranaceus, Mont. (sp.)

Mr. John Humphreys of Cork has informed me that a specimen occurred to Mr. Beevor and himself when dredging in the harbour; "the animal was large, about 2 inches in length, and the shell a very good one;"—the species had not before been met with by Mr. Humphreys. Belfast Bay and off Groomsport, Mr. Hyndman.

ORDER TECTIBRANCHIATA.

Genus APLYSIA.

A. depilans, Linn. Generally distributed in Ireland.

A. punctata, Cuv. General.

A. nexa, Thompson.

Animal elongate, deep carmine-red, mantle bordered with black. Length 1 inch, much elongated, foot very narrow; two black eyes anterior to, but a little distant from, the base of the dorsal tentacula.

Colour deep carmine-red, occasionally with a few minute white spots; mantle and anterior tentacula bordered with black, dorsal tentacula tipped with black.

The specimen of this *Aplysia* was dredged on the 26th of August, 1844, off Castle Chichester, Belfast Bay, by Mr. Hyndman—depth 6 to 10 fathoms. The characters which this beautiful little *Aplysia* has in common with *A. depilans* need not be given. Whether we consider it distinct from, or a mere variety of, that species, it differs from it in being of a more elongate form, in colour, and in having the mantle, &c., bordered with black.

From a single example only I should not venture to describe it as a distinct species, but on sending my specimen (its characters being first noted down) alive in sea-water to Newcastle-upon-Tyne, for Mr. Alder's examination, he replied, that an *Aplysia* similar in form and colour had been taken by him at Torbay in Devonshire, about two years before, but, not having had much opportunity of studying the genus, he felt uncertain whether it should be considered a variety of an *A. depilans*, or a distinct species. Neither do I feel certain on this point, until an equally small *A. depilans* be had for comparison; but it seems to me better to describe and figure the form in question, and leave the matter of species for future decision, than to be altogether silent on the subject. A coloured drawing of Mr. Alder's specimen being kindly transmitted to me, it was found to represent mine exactly, except in the very trivial difference of having a

few minute white spots on the sides, instead of being of a uniform colour. Specimens of *A. depilans*, which I have often taken (but never of so small a size), differ in being occasionally spotted as well as plain. But I have never met with this species of the same form as *A. nexa*, of its fine deep red colour, nor having any black border to the mantle, &c.; nor has Dr. J. L. Drummond ever done so, though great numbers came under his examination when dredging at Donaghadee, on the coast of Down, in the summer of 1843. Hab. Belfast Bay, Ireland.*

Genus CYLICHNA.

C. strigella, Lovén. Arran, Galway, Mr. Barlee.

Genus BULLA, Linn.

B. Lignaria, Linn. Generally distributed.

B. Akera, Mont. Generally distributed.

B. hydatis, Linn. Cork, Mr. Humphreys; Galway, Dr. Farran.

B. Cranchii, Leach. Cork Harbour, Mr. Humphreys; Galway, Mr. Barlee; Bangor, County Down, Mr. Hyndman.

B. umbilicata, Mont. East, West, and South of Ireland.

B. diaphana, Turt.

Two specimens have been taken by Mr. Hyndman and myself, when dredging in Strangford Lough, and the species has been found by Mr. J. W. Warren at Portmarnock, on the Dublin coast.

B. cylindracea, Penn. Generally distributed.

B. truncata, Adams. Generally distributed.

B. obtusa, Mont. Generally distributed.

B. mammillata, Phil.

Procured on the coast of Galway, in 1848, by Mr. Barlee.

B. hyalina, Turt.

Obtained at Portmarnock by Mr. Warren; and in shell-sand collected at Bundoran and Ballysodare, on the western coast, by Mrs. Hancock.

B. pectinata, Dillwyn,

Has been found at Portmarnock, by Mr. Warren, and at Bundoran (County Donegal), by Mrs. Hancock. Mr. Humphreys of Cork notices it under Leach's name, as procured by him there in the stomach of a sole (*Solea vulgaris*).

Genus BULLÆA, Lamarck.

B. aperta. Generally distributed.

B. pruinosa, Clark.

A dead specimen was obtained by George Barlee, Esq., by dredging on gravelly mud at Birterbuy Bay, in May, 1848, at a depth of from 12 to 15 fathoms.

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* *Aplysia depilans* of British writers is not the *A. depilans* of the Mediterranean. *A. nexa* is the young of the *A. hybrida*, Sow.; the latter being the name adopted by Forbes' and Hanley's Mollusca.—ED.

B. punctata, Adams (sp.): Turt. Loudon's Mag. Nat. Hist., vol. vii. p. 353.

Obtained from three localities on the western coast—Miltown Malbay (Prof. Harvey), Kilkee in the County Clare, and Bundoran (Mrs. Hancock).

B. catena, Clark. Miltown Malbay; rare.

"A beautiful little species, about a line in length, marked with elegant chain-like bands." Prof. W. H. Harvey.

Genus ACTÆON.

A. viridis, Mont. (sp.).

With a letter dated from Glandore House (County Cork), August 23rd, 1844, Professor Allman sent me a small phial containing specimens of this *Actæon*, remarking that he had just taken it there in considerable numbers. He subsequently, at the meeting of the British Association at York, gave an admirable account of the anatomy of the species, illustrated by drawings of remarkable beauty, executed by his sister, Miss Allman. About the same time the Rev. Mr. Landsborough informed me that he had taken this species on the coast of Arran, Firth of Clyde.

ORDER PULMONIFERA. INOPERCULATA.

On the subject of the Conchology of Ireland, three Catalogues were published within a comparatively short period; Dr. Turton's in July, 1816, in the Dublin Examiner, or Monthly Miscellany of Science, Literature, and Art; Capt. Brown's, in the second volume of the Wernerian Memoirs in 1818; and in this same year a third appeared in the Appendix to Walsh and Whitelaw's History of Dublin, from the pen of M. J. O'Kelly, Esq., of that city. The species of land and fresh-water Mollusca enumerated in these three Catalogues are much the same, and about fifty in number. In the subsequent works of Brown and Turton a few more species were added. To Bryce's Tables of Simple Minerals, Rocks, and Shells, found in three of the northern counties, published in 1831, Mr. Hyndman contributed two species hitherto unnoticed. In the London and Edinburgh Philosophical Magazine for 1834 (p. 300), about thirty additional species were made known by myself; in a paper entitled Additions to the Fauna of Ireland, published in the Annals for last March, I noticed a few more; and in the present communication there are two species previously unrecorded. I shall here, for the sake of brevity, avoid entering into detail respecting any of the species thus alluded to, but shall correct in its proper place in the following paper, in so far as my information extends, every error, either of others or of my own.

The order in which the genera and species appear in Mr. Gray's edition of Turton's Manual of the Land and Fresh-water Shells of the British Islands is adopted.

Family LIMACIDÆ.

Genus ARION.

A. ater, Linn.

La Bergerie, Queen's County; County Galway; Finnoe, County Tipperary, Mr. Waller. Too abundant in both places, varying from the light yellow-coloured variety through all the shades of brown or ochre to deep black. The brown variety seems to predominate in Killereran (County Galway) meadows and woods, but I have repeatedly observed the two colours indiscriminately mixed together in precisely the same localities, both in fields and gardens. The yellow, which I have never taken of the full size, is mostly confined to the decaying pieces of wood found among damp moss. I have not noticed the variety with the scarlet foot, as in fig. 2, tom. ii. Fér. Specimens brought alive, by Dr. Ball, from the circular road, Dublin (*Aug.* 12), and taken within a few yards, were black, with black keel,—greyish-black, or rather blackish-grey, with orange-brown keel,—fawn-coloured grey, with brownish-orange keel,—head and tentacula blackish, very pale greyish-white, with orange keel,—head and tentacula blackish: a very handsome animal.

I have seen two individuals busily engaged devouring a snail (*H. aspersa*), both their heads being introduced within the shell: the snail appeared to be fresh killed.

A. hortensis, Fér.

La Bergerie and County Galway. By no means scarce. Férussac's figures agree accurately with mine, but are represented of larger dimensions than any I have seen. I have taken the young of a very minute size with the orange foot, and the colours equally as deep as in adult individuals. Var. *a.* f. 6, Férus., is not more abundant here than the orange-footed one, which I have never succeeded in finding at Killereran, where the variety is common in violet-beds. The following from Férussac agrees curiously with my habitat: "Elle se cache le jour sous les tiges de violettes de fraisiers et des autres plantes touffues." Mr. Alder remarks of the variety, "The variety only, if such it be, has yet been noticed in this country." I have never discovered even the rudiment of a shell in any of them. Finnoe, Tipperary; and Annahoe, Tyrone; Mr. Waller.

N. B. I have before me at present an *Arion*, found along with *A. hortensis*, var. β. Pfeiff. The only character it possesses in common with it is, in the position of a yellow-coloured fascia running round the body, which is of a dusky brown, the sides greenish-yellow, the fascia becoming indistinct on the shield. It differs materially in colour from any variety of the *A. ater* I have met with; and what might characterize it as belonging to this species is the shape and colour of the tentacles and head, the former being much more elongated than in *A. hortensis*, and of a shining black colour. The edge or side of the foot is likewise similar to *A. ater*, being greenish-yellow, marked with the peculiar transverse black lines. Its mucus is yellow-coloured, whereas that of *A. ater* is whitish, or colourless. Since writing the above, I have obtained a second specimen, similar in every respect to the former, except the fascia, which is not so distinct.

Genus GEOMALACUS.

G. maculosus, Allman.

On moist rocks, County Kerry, Mr. Andrews, 1842. Dr. Allman describes it as "a species of great zoological interest, constituting as it does a remarkable link between *Arion* and *Limax*. It is an exceedingly beautiful animal; the colour of the shield and upper part of the body is black, elegantly spotted with yellow, the under surface of the foot light yellow, and divided into three nearly equal bands; the edge of the foot is brown with transverse sulci. It possesses a singular power of elongating itself, so as at times to assume the appearance of a worm. By this means it can insinuate itself into apertures which we could scarcely conceive it possible for it to enter. This curious property indeed was very nearly the cause of my losing the specimen from which the description has been taken. I had placed the mollusc, as I supposed securely, in a botanical box, when to my surprise I found shortly after that it had transgressed the limits I had assigned it.

"The creature, not liking its confinement, had insinuated itself beneath the lid, which, not closing very perfectly, had afforded for its escape a fissure of about a line in width. I was fortunately in time to re-capture my prisoner, and the knowledge which I had thus gained of his habits suggested a stronger prison for the future."

Genus LIMAX.

L. maximus, Linn.

This, the common "large grey slug," is equally abundant in North and South. In the stomach of the Song Thrush (*Turdus musicus*) I have frequently found the shell of this species, the *Limacella parma* of Turton's Manual, after the animal of which it had been part had been entirely dissolved. I have procured similarly the shells of the smaller *Limaces* from the Blackbird (*Turdus Merula*). This species is accused by Miss M. Ball of making its way into pantries and eating holes in bread.

Rev. B. J. Clarke mentions the following varieties as found in Ireland.

Var. A. Drap. and var. B. Férus., in County Galway.

Var. B. Drap. }
Var. Z. Férus. } County Cork, Dr. Ball.

Var. Y. Drap. and var. V. Férus. Queen's County, and County Galway.

Var. Nilsson's ? }
Cinereo niger. } County Cork, Dr. Ball.

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L. arboreus, Bouchard.

N. of Ireland, on trees.
Spire Hill Wood, and Emo Park, Queen's County.
Monivea Wood; Woods, Dunmore.
Tuam palace demesne.
Benvyle, in ruins of a chapel (Clarke, *loc. cit.*).
Annahoe, Tyrone, on beech trees, Mr. Waller.

L. flavus, Linn.

In Dr. R. Ball's collection are a number of these, which were brought

by him from Youghal. In the North it has occurred to myself. Finnoe, County Tipperary, Mr. Waller, 1846.

L. agrestis, Linn.

This, the small rough yellowish species, is very common throughout the North, and I believe Ireland generally.

Queen's County and County Galway. Common; of all shades and degrees of colour and markings, from the pale yellowish-white of *L. filans* to the darkest variety of reddish-brown. Several seen at Tory Island by Mr. Hyndman. Yesterday, July 21st, I had the gratification of seeing them repeatedly let themselves drop down to the table from the lid of a tin box, where, for the purpose of taking some drawings of the different varieties, they were held.

A similar feat was performed by the full-grown and dark varieties, which were on the same box with *L. filans*, but they did not appear to possess the same facility, and were more reluctant in resorting to this expedient for escaping from the confined space on which they were placed. Turton, in his description of the shell of this species, makes no mention of the membranaceous margin. I have now eight specimens before me, taken from the animals this morning; the following is an attempt at their description:—shell rather variable; in shape usually oblong oval, somewhat larger than those found in *L. Sowerbii*, but much thinner, and without the same abrupt thickening in the centre; with a membranaceous edge, all of them concave, as much so in proportion to size as in *L. parma*.

Limax carinatus, Gray.

La Bergerie; Monivea, County Galway; Clifden, Cork; under stones in fields, and in tufted plants in gardens.

Aug. 10.—Went with Dr. Ball to the circular road, and obtained a few specimens of this species; they were of a rich dark-brown with orange-brown keel; they are very well represented in Gray's fig.—Clifden, July, 1840; Cork, Mr. Humphreys.

There is not any figure in Férussac to which I could refer the La B. varieties (if they are varieties). Nor does Mr. Gray's description agree well with them; the word "tesselated" does not accurately describe the distribution of their colours. Their head and tentacles are never "black," but always *grey*, or bluish-grey. The usual colour is yellowish-brown, often approaching to dusky, sides pale, grey *clouded* with light yellow, head and tentacles bluish-grey.

Variety.—Deep dusky or nearly black, sides pale grey, head and tentacles bluish-grey.

The young have the keel yellow-coloured, which in adults is generally the same colour as the back. The extreme dark colour of the variety led me at first to confound it with the *L. gagates* of Férus. He remarks of one of the varieties of *L. gagates*, "Elle est d'un gris bluâtre ou nourâtre . . . . plus pale lateralement." I have seen but a single individual in Monivea; it was identical with the variety.

The internal shells are a size smaller than those of *L. agrestis*; they have no membrane on the edge, are opake, much thicker, and not concave; the peculiar thickening process in the centre gives them the appearance of having a marginal zone, or as if a smaller-sized shell were placed on the top and centre of the larger, leaving a rather broad margin, which is usually of a rufous colour towards the top.

I find that this species is capable of forming a slimy thread in the same

manner as *L. filans*. Having placed one on a laurel, I was surprised by seeing it forthwith make use of this means for conveying itself in safety to the ground. I have since succeeded in making other individuals act in a similar way. The spinning *limaces* may be easily forced to do so by leaving them on an evergreen or other tree which may not be congenial to their tastes, when they will speedily effect their escape in this manner.

L. gagates, Drap.

Tuam; Dublin (1840); Clifden (1840); La Bergerie, Queen's County; Tuam Palace Gardens, Co. Galway; Tourkmacady Lodge, near Ballinrobe, Co. Mayo; Rev. B. J. Clarke (*loc. cit.*).

Genus TESTACELLUS.

T. haliotideus, Fér.

This species was discovered many years ago by Dr. R. Ball, in the Town Gardens, at Youghal, where it has become much scarcer of late. The Irish specimens agree with English examples of the var. *V. scutulum*, with which I have been favoured by Mr. G. B. Sowerby. Mr. Gray (Man. p. 123, 124) seems to consider this a naturalized species, but the circumstance of its being found at Youghal speaks more strongly in favour of the *T. haliotideus* being a true native than that of its being met with in some of the gardens around London, to which it might much more readily have been introduced along with exotic plants. In a garden at Bandon, too, a *Testacellus* has been procured by Dr. G. J. Allman. The circumstance of this species, indigenous to France and to the island of Guernsey, being found only in the south of England and Ireland seems to me strongly in favour of its being equally indigenous to these countries. Dr. Ball, in reply to some questions, observes, "I first became aware of this *Testacellus* preying on worms by putting some of them in spirits, when they disgorged more of these animals than I thought they could possibly have contained; each worm was cut (but not divided) at regular intervals. I afterwards caught them in the act of swallowing worms four and five times their own length. Some of these *Testacelli*, which I brought to Dublin and put in my fern-house, produced young there."

Testacellus found in flower-gardens and neighbouring grounds, about Youghal; about Bandon also. *March*, 1847.—I received three living specimens from the vicinity of Cork, from J. D. Humphreys.

Family 2, HELICIDÆ.

Genus VITRINA.

V. pellucida, Drap.,

Is in suitable localities distributed over Ireland, and may be found under the first stones we meet with in going inland from the sea-shore, up to as great an altitude in the mountain-glens as there are moss and leaves to shelter it. I have remarked the colour both of animal and shell to vary, and the latter to present some differences in form. See Jeffreys on *V. Mulleri* and *V. Draparnaldi*, in Linnæan Transactions, vol. xvi. When thin, and of an almost crystalline transparency, the shell is often more handsomely formed than when thicker and of a greenish colour, and is intermediate between the *V. pellucida* and *V. diaphana*, as represented by Draparnaud (pl. 8) and Rossmassler (t. i.); this state is equally common with the normal *V. pellucida*, of which the animal is lighter in colour, and not so large compared with the shell as in the variety.

Genus HELIX.

H. aspersa, Mull.

Although distributed over the four quarters of the island, this *Helix* is less generally met with than several other common species. In a well-cultivated and moderately-wooded district near Belfast, stretching along the base of the mountains where chalk chiefly prevails, presenting different soils, especially clay and alluvium, and rising to an elevation of 500 feet above the sea, it is never found. Mr. Edward Waller, who has successfully investigated the Mollusca about Annahoe, County Tyrone, states that the *H. aspersa* is unknown there. It seems partial to the vicinity of the sea; so much so, that about Ballantrae, in Ayrshire, Scotland, I have remarked numbers of them on rocks subjected to the spray of the waves, which had bleached the portion of the shell thus exposed as white as it usually becomes in the progress of decay, although the animal inhabitants were all in the highest vigour. In the crannies of the ruined castles, which, like Dunluce, are based upon the summits of some of the highest cliffs washed by the sea in the North of Ireland, the *H. aspersa* is abundant.

In one instance which may be mentioned, differences of rocks, soil, or shelter will not explain the absence of this species from particular localities. During a forenoon's walk on the marine sand-hills of Portrush and Macgilligan (County of Londonderry), which are only a few miles apart, and present in every respect precisely the same appearance, I found the *H. aspersa* abundant at the former, but at the latter wanting, and here the sand-hills are much more extensive than at Portrush. At the nearest sand-hills, again, on the coast to the east of the latter, and only a few miles distant, I did not during a short visit find the *H. aspersa*; and here *Helix virgata*, which is not found at the other two localities, appeared, and took the place of *H. ericetorum*, which is common to them; here too, and at Portrush, *Bulimus acutus* was present, though not so at Macgilligan. On the 8th of June I once observed the *H. aspersa* in coitu, and with the spicula adhering (see Montagu in Test. Brit.);—these are half an inch in length, hollow, and widen considerably to the base.

In the Magazine of Natural History, vol. v. p. 490, Mr. Denson states that in severe winters the *H. aspersa* is, in the old Botanic Garden at Bury St. Edmunds, eaten in quantity by the Norway rat; a fact of which I some years ago had circumstantial evidence, in the broken shells lying about the entrance to this animal's abode among heaps of stones in the Horticultural Society's Garden, at Chiswick, London.*

* *Helix Pomatia*, Linn. The following observations of Professor W. H. Harvey, communicated in a letter to me in January, 1834, include all that need be said of this shell. "Dr. Turton, in his Conchological Dictionary, states that this species is mentioned by Dr. Rutty in his Natural History of the County of Dublin, as not uncommon in his time. On referring to Dr. Rutty's work, I cannot find any such assertion. At p. 379, vol. i., he certainly admits it in the following terms: 'Cochlea duplex primo terrestris, the terrestrial snail, and particularly the house snail, which is thus distinguished by Lister; Cochlea cinerea maxima edulis, cujus os operculo crasso gypseo per hyemem clauditur:' and then goes on to tell of its uses as food, the manner of cooking it, &c., but not one word about its habitat."

The *H. Pomatia* has of late years been introduced from England to different localities in Ireland, as Dalkey Island, off the Dublin coast, Youghal, &c. In the autumn of 1834 I turned out a few individuals of this species and of *Cyclostoma elegans* on the chalk in the neighbourhood of Belfast, but they have not increased;

H. hortensis, Lister. Gray.

Although apparently not numerous anywhere, it would seem to be widely distributed in Ireland. To myself it has occurred about Dublin, and at Portrush, along with *H. nemoralis* and *H. hybrida*; has been obtained in the County Donegal; at Moira and Newcastle, County Down; King's County; Kildare; Tipperary; and about the city of Cork. As some authors make the white lip and less size the only differences between this species and *H. nemoralis*, I was for some time in doubt whether it might not be a small variety of the latter, but was fully satisfied of its distinctness by finding both species plentifully in company at Dovedale (Derbyshire), when every individual in size, &c., maintained the respective characters of its species. The *H. hortensis* seems partial to limestone districts.

H. hybrida, Poiret. Gray.

In July, 1833, I obtained the handsome *Helix*, so designated by Mr. Gray, on the marine sand-hills at Portrush, near the Giant's Causeway, along with different varieties of *H. nemoralis* and a very few individuals of *H. hortensis*. When shown to Mr. Gray in the following spring, he considered the specimen to be *H. hybrida*. Judging from the shell alone, I should not be disposed to consider this *Helix* more than a variety of *H. nemoralis*.

H. nemoralis, Linn.

This *Helix*, presenting its endless and beautiful varieties in colour and the number and breadth of bands, is more commonly distributed over Ireland than any other species. When on the extensive rabbit-warren or marine sand-hills at Portrush, on the 10th of July, 1833, I remarked it, together with *H. aspersa*, *H. ericetorum*, and *Bulimus acutus*, to be not only abundant but huddled together in heaps; the animals were alive in all, and of the *H. nemoralis* several had the apertures closed up. Among the individuals of this species, some were of the white-lipped variety, which has not uncommonly been mistaken for *H. hortensis*: others had the lip of a rose colour, margined with white (*H. hybrida*): the specimens, which were so numerous that every variety of shade in the lip, from white to the darkest brown, could be traced, seem to prove that the colour of the lip no more than that of the shell is of any specific value. The absence of the Thrush genus (not an individual belonging to it could be seen on this occasion), of which some species feed very much on these mollusca, may be one cause of their being permitted to increase and multiply to such an extent. Considerably the largest specimens of *H. nemoralis* that I have collected were obtained in the South Islands of Arran, off the coast of Clare. This species is generally noticed as inhabiting "woods and hedges," but to myself it has never occurred so abundantly in the vicinity of either wood or hedge (about which its enemies "most do congregate"), as entirely remote from them; or among the debris of limestone or chalk cliffs and quarries, and on marine sand-hills. Found on Tory Island by Mr. Hyndman, Aug., 1845.

The Rev. R. Sheppard has observed in Suffolk that the plain-coloured, the single-banded, and the many-banded, do not mingle with each other in coitu, but that each is true to its banded or bandless mate. (Linn.

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after a few months I could not find one of either species about the place. See Gray, Man., p. 35.

Trans. vol. xiv. p. 163.) In Ireland those so differing have no such scruples; such as I have seen in connexion, and displaying each other's spicula or love-darts, have been very dissimilar in colour and markings; they have so occurred to me from the middle of April to that of September. Mr. Hyndman once found a spiculum of this species stuck through the leaf of a dandelion (*Leontodon Taraxacum*); if there be but the one use in the missile, it would thus seem that the animal will occasionally miss its aim.

A *H. nemoralis* of ordinary size, which I found near Belfast, exhibits a prominent tooth where the basal margin joins the whorl. I have in the month of May detected the blackbird preying on this *Helix*.

H. arbustorum, Linn.

This delicate and handsome species was noticed by Capt. Brown and Dr. Turton as having been found about Dublin; at Killarney, the Rev. Thomas Hincks, of Cork, informs me that it is met with; but the North seems to be its more favourite abode; in suitable localities throughout the County of Antrim it prevails, as it likewise does in Down, but more sparingly. Of 147 specimens collected at the same time in the neighbourhood of Larne, in the former County, all were of the ordinary state, or marked with the dark band (see Pfeiffer, tab. 2, f. 7), except 12, which were of the variety in which the band is wanting, the spotting much paler, and the colour generally much lighter. (Pfeiff. tab. 2, f. 8.) Having collected this species in England and Scotland, as well as Ireland, I may observe that moisture and shelter in a certain degree have always seemed to me its desiderata. At Dovedale in Derbyshire, and at Knockdolian in Ayrshire, it occurred plentifully about moist limestone cliffs, and in the latter locality with little more than ferns (especially *Cystea fragilis*) to shelter it. In the North of Ireland I have met with it in shady woods in the lower grounds, and likewise in young plantations at a considerable elevation in the mountains, and where there was no more shade or moisture than the *Luzula sylvatica* requires. From its shell being so easily broken, this animal is a favourite food of the thrush genus. (See Magazine of Zoology and Botany, vol. ii. p. 436.)

H. pulchella, Mull.

This species may more literally than most others be stated to be distributed over Ireland, for it is the verge of the sea that marks its boundary. Although occurring throughout the inland parts of the country, it seems especially to delight in the short pastures in the vicinity of the sea around the entire coast; in some of the islets of Strangford Lough, too, I have in like manner observed it.

The var. *H. crenella*, Mont., has been considered by some naturalists peculiar to damp situations; but with this my observation does not accord, the beautiful ribbed variety being more frequent than the smooth state on the dry sea-banks of the North of Ireland. Mr. E. Waller writes to me, with reference to Finnoe, County Tipperary, "I have found both varieties of *H. pulchella* in high and dry grounds, as well as damp and low."

H. fusca, Mont.

This handsome species was noticed by Turton as Irish, but merely in the words "woods in Dublin." (Conch. Dict., p. 61.) It is found in the North, East, West, and South, but in King's County and Tipperary has not been met with by my correspondents. As this species, though widely

distributed, is by no means common; the following habitats may be enumerated. Glens in the Belfast mountains and Drumnasole, County Antrim; Florence Court, County Fermanagh, W. T. Altadawan, County Tyrone, and Annagariff Wood, County Armagh, Edward Waller, Esq.; Kilruddery demesne, County Wicklow, T. W. Warren, Esq.; Monivea, County Galway, Rev. Benj. J. Clarke; "near Limerick once," W. H. Harvey, Esq.; Youngrove near Youghal, Miss Ball; Dunscombe Wood, near Cork, Miss Hincks: in this locality the Rev. T. Hincks, who has supplied me with very fine specimens, remarks that it is abundant. The following notes are perhaps not irrelevantly introduced. Dec. 16, 1833.—Although several times before in Colin Glen, near Belfast, in search of Mollusca, I to-day for the first time, in consequence of its somewhat peculiar haunts, obtained specimens of the *H. fusca*, and of them about two dozen. The ground was saturated with moisture, and they were all briskly traversing the rich green leaves of the *Luzula sylvatica*, and one or two other plants of similar foliage. The animal is much elongated, and moves about with considerably greater rapidity than any *Helix* I have seen; its colour is uniform, but in different individuals varying from "wine-yellow" to blackish-grey; tentacula of the latter colour, the longer pair in the adult animal 2½ lines in length; from their base a black line extends along the back for 3 lines. Dec. 10, 1837.—In Colin Glen to-day I obtained upwards of thirty of these *Helices*. The ground was wet, but there had been no rain in the preceding night, and consequently they were not found (with a very few exceptions) on the *Luzula*, but were instead lying sheltered and quiescent beneath masses of the fallen leaves of forest trees contiguous to that plant. About three o'clock, when it began to grow dusky, they commenced stirring about on the green leaves of their favourite *Luzula sylvatica*, where in less than half an hour I procured a dozen of them. I have since occasionally seen this species on the stems of trees at a considerable height from the ground and in very dry weather.

H. fulva, Mull.,

Although not common, is generally distributed over the island, and found in woods among fallen leaves and timber, and under stones, &c., in various situations, from the sea-side to the mountain. It seems rarely to occur in quantity, but once, at Wolfhill near Belfast, I found thirty individuals congregated under one small stone.

The *H. Mortoni*, agreeing both in animal and shell with Mr. Jeffreys's description (Linn. Trans. vol. xvi. p. 332), is obtained along with *H. fulva*, but has always seemed to me wanting in sufficient characters to render it a distinct species. That the animal of *H. Mortoni* is lighter coloured than that of *H. fulva*, is not of consequence, as the young of various *Helices* are lighter coloured than the adults.

H. aculeata, Mull.

Although the individuals of this *Helix* are generally but few in number where they do occur, the species is distributed over Ireland, and is found in moss, on fallen timber, under stones, &c.—out of "woods" I have as frequently met with it as in them: high up the limestone mountain of Ben Bulben (County Sligo) I have obtained it, but nowhere in Ireland have seen so many specimens together as in the limestone debris at Feltrim Hill near Dublin. From the marine sand-hills at Miltown Malbay, on the western coast, Dr. W. H. Harvey has supplied me with a

few specimens, noting the species at the same time as "very rare." Mr. T. W. Warren of Dublin informs me that early last winter he procured sixty individuals of this species on one occasion near Portmarnock (County Dublin): some weeks previous to this time he found a few specimens at the place, and following the plan of the Rev. B. J. Clarke, he laid down sticks and stones that they might shelter under them, and with such success that he obtained this number. None of our Mollusca more than this requires the collector to be wide awake, else he may pass it by for a pellet of dirt, or at least a seed. As one of the rarer species, it may be mentioned that out of Ireland I have found this shell at Dovedale, Derbyshire, the "dean" at Twizel House, Northumberland, and near Ballantrae in Ayrshire.

H. lamellata, Jeffreys.

This attractive species is widely distributed in Ireland, and is found on the decaying leaves and fallen branches of trees, in moss, and under stones in shady and generally moist situations. I first met with it in Sept., 1833, in the Glen at Holywood House, County Down, and soon afterwards in various localities throughout this County and Antrim; about O'Sullivan's cascade, at the lower lake of Killarney, I had the gratification to find it in June, 1834, and subsequently in the Glen of the Downs, County Wicklow. By the Rev. B. J. Clarke it has been obtained at La Bergerie, Queen's County, and by the Rev. T. Hincks of Cork at Dunscombe Wood near that city, and likewise at Ballinhassig Glen, between Cork and Bandon. Mr. Hincks remarks that the species appears to be far from uncommon in that district.

The following note relates to my most successful capture: April 30, 1837.—In Colin Glen (near Belfast), during an hour's patient search today, I collected from amongst a mass of the dead leaves of trees contained within the area of a square foot twenty-one full-grown individuals of *Helix lamellata*, and about half this number of younger specimens; both shell and animals of these latter are lighter coloured than the old, indeed almost hyaline, and the lamellæ are apparent on the very youngest, which also exhibit the satin-like lustre of the adult. The mature animal is white beneath; the tentacula, back, and sides greyish black; lower tentacula of moderate length, upper long and somewhat club-shaped.

In Auchairne Glen, near Ballantrae, Ayrshire, I obtained this species in August, 1839.

H. granulata, Alder, Mag. Zool. and Bot., vol. ii. p. 107; Gray, Man. p. 151, pl. 3, f. 29.

H. hispida, Mont., p. 423, t. 23, f. 3.

This would seem to be a very local species with us. By Dr. W. H. Harvey I was in 1834 supplied with specimens, accompanied by a note, stating that the species had occurred to him in "moist places, and the rejectamenta of streams about Limerick and Ballitore (County Kildare)." At the same time Mr. Humphreys, of Cork, reported it to me as found, but not commonly, at "Belgrove demesne, east of Cove."

H. hispida, Mull.

This species is generally distributed over Ireland. It is one of the most common land shells in the North, and may be found under stones, fallen trees, decaying leaves, &c., from the sea-shore to the most elevated chalk districts, and both in moist and very dry situations. It is most variable

in colour; from beneath the same stone I have procured specimens varying from a crystalline transparency to dark reddish-brown, and in these differences the animal participates with the shell; like *H. rufescens*, Mont., and some other species, it occasionally presents a white band on the last volution; in the very youngest state this species is hispid, and quite depressed or flat above. The internal rib, in what—to distinguish it from *H. concinna*—may be called the normal state of *H. hispida*, which I find in the North, is generally wanting. On supplying Mr. Alder with specimens of these in April, 1836, he observed that they were the most strongly-marked varieties he had seen; and, about the same time, M. Michaud, in acknowledging specimens I had sent him, remarked upon them as a very fine variety of *H. hispida*. The shells thus alluded to are of the most common form in the North of Ireland; and are larger, more depressed, and with the umbilicus comparatively wider, than in specimens which I have found in various parts of England and Scotland, and which are similar to those that, under the name of *H. hispida*, have been sent me from Newcastle by Mr. Alder, and from Lorraine by M. Michaud; specimens the same as the English and French are likewise to be met with in the North of Ireland, but are rare comparatively with the others.

NOTE.—Sept. 17, 1837. On looking to the animals of full-grown specimens of this *Helix* collected at Wolf hill near Belfast, I could not perceive any difference between the inhabitants of the very hispid shells wanting the internal rib, and those having the rib and displaying very few hairs: the animals are commonly pale grey above and whitish beneath; in the very hispid shells they varied from this colour to black.

Var. *sericea*, Muller.

In the rejectamenta of the river Lagan, near Belfast, I have obtained specimens corresponding with those favoured me by Mr. Alder under this name. This shell is, in general form, size of umbilicus, &c., intermediate between *H. hispida* and *H. granulata*, but hardly differs more from the ordinary state of *H. hispida* than the specimens of it common to the North of Ireland do, and which are considered by Mr. Alder and M. Michaud only varieties of the species bearing this name. I cannot look upon it otherwise than as a var. of *H. hispida*. Great Island, Cork, Mr. Humphreys.

Var. *concinna*, Jeff.

The shell alluded to under this name is that described by Mr. Alder as "stronger, and with the hairs more deciduous, than the usual form [of *H. hispida*]," Mag. Zool. and Bot., vol. ii. 107; and which, I would add, is generally more convex, and has an internal rib, which in *H. hispida*, at least as I find it in the North of Ireland, is more often wanting than present. It commonly in Ireland takes the place of *H. rufescens*, Mont., where this is not found, as it has been remarked by Mr. Alder to do in England. In the northern half of the island it prevails abundantly; and as the *H. rufescens* decreases northwards so does the *H. concinna* southwards; from extreme East to West they both range: in the central parts of the country, where both occur, they retain their distinctive characters, the *H. concinna* being smaller, more convex, and darker in colour than its ally. About Cork, Messrs. Wright and Carrol.

Specimens of *H. concinna* from the neighbourhood of Bristol, favoured me by Mr. Jeffreys, are, as he now considers, certainly nothing more than

H. hispida, and in its ordinary depressed form; still the *typical* specimens of these two *Helices* are very distinct in appearance, but through their varieties would almost seem to unite.

"*H. circinata*, Fér."

I cannot perceive any difference between some of my North of Ireland specimens of *H. concinna*, when completely denuded of their hairs, and a shell so named which I owe to the kindness of Mr. Alder.

H. rufescens, "Penn."

This species is common to the southern two-thirds of the island: as far North as Banbridge in the County of Down it has been found, and on old walls at Rostrevor, 1848, by the Rev. G. Robinson.

H. Pisana, Mull.

This fine, and local species, was first noticed as Irish in Turton's Catalogue (p. 8), from specimens collected at "Balbriggan Strand," or, as more correctly given by their discoverer, M. J. O'Kelly, Esq., in the edition of Pennant's British Zoology published in Dublin in 1818, "near Balbriggan, on the County Meath side of the stream that divides this County from Dublin," vol. iv. p. 369. By Mr. O'Kelly and Mr. T. W. Warren I have been favoured with specimens of *H. Pisana* from this locality. My friend R. Callwell, Esq., of Dublin, informs me that this species has been found at another, though not far distant, station, by Mr. Joseph Humphreys, on the North side of the river Boyne, three miles east of Drogheda, and ten North of Balbriggan. Iveragh, Kerry, Mr. Andrews.

H. virgata, Mont.

In the North, East, and South, this species is found, but in the West I am not aware of its presence. It is a local species, occurs on the marine sand-hills at Ballycastle, in the North of the County Antrim; Dundalk (County Louth); Dublin, Wicklow, Youghal, and Cork; and at the inland localities of La Bergerie, near Portarlington, and Ballitore (County Kildare). Finnoe, County Tipperary, Mr. Waller. *H. virgata* is one of the species which seems to follow no rule in the choice of its abode or in that of its associates, or rather whose absence from or presence in particular districts cannot be accounted for; it will be abundant on sea-banks at one place, and for a hundred miles again will not appear in similar localities. Some authors have remarked, from their own accurate observation in particular localities, that it is never found with *H. ericetorum*: and Dr. W. H. Harvey, in supplying me with notes of four inland and marine stations in which he had observed it, remarked, "I have noticed that this species is never found mixed with *H. ericetorum*, nor is it generally in the same neighbourhood;" yet not very far distant from one of those alluded to both species are found in company,* and on the same plant.

In the collection of T. W. Warren, Esq., of Dublin, is a very fine series from one locality, Portmarnock, presenting every variety of colour and

* In Dr. R. Ball's cabinet, and collected by him near Howth off a single plant of *Beta maritima*, are specimens of a pure white colour, others of a uniform dark chocolate brown, in addition to the more common state, white with brown bands and the reverse.

bands that I have seen described, from the hyaline and opaque white to the darkest brown. *H. ericetorum* has in similar variety been procured by this excellent and indefatigable collector at the same place, and *H. Pisana*, likewise differing, he possesses from its not far distant station :— one of the most beautiful of these three species is opaque white with hyaline bands. At La Bergerie, near Portarlington, Mrs. Patterson of Belfast obtained a specimen of *H. virgata*, which both in form and colour bears a rude resemblance to the *Helix elegans* of Brown.

H. caperata, Mont.

In Brown's Irish Testacea this species was noticed to be "not uncommon at Naas on mud walls," p. 526 ; and "Bullock in Ireland" was given by Dr. Turton as a habitat. (Conch. Dict. p. 51.) The *H. caperata* is in Ireland a very local species, is found in the southern half of the island, and appears to be plentiful where it does occur. From Dr. W. H. Harvey I had specimens in 1833, which were collected by him at Glanmire, near Cork ; on "dry banks at Kilkee Castle, near Ballitore, County Kildare," he had likewise procured the species. At Kingstown, near Dublin, contiguous to Dr. Turton's station, it has been collected by Mr. Warren. At La Bergerie (Queen's County) it was a few years ago obtained in abundance by Mrs. Patterson of Belfast. Among the specimens brought from this locality (and presenting gradations in colour from the ordinary state to that of being almost wholly of a deep reddish-brown) was one shell entirely of a pale amber colour, and transparent, the fine and regular striæ rendering it very beautiful. Here, in addition to this species, *H. ericetorum* and *H. virgata* were found by Mrs. Patterson, and were abundant on the same plant, the *H. caperata* being the most plentiful.

The distribution of *H. caperata* seems rather anomalous ; it is unknown to me in the North of Ireland, but on the walls of the houses in Portpatrick, one of the nearest parts of Scotland to this country, I have remarked it ; about Ballantrae, in Ayrshire, it has not occurred to me ; at the base of the cliffs at Salisbury Craigs, near Edinburgh, in 1834, I procured it in abundance.

H. ericetorum, Mull.

This *Helix* differs from its nearest British allies, *H. virgata*, *H. Pisana*, and *H. caperata*, in being pretty generally diffused over Ireland and the adjacent islands ; most of the marine sand-banks around the coast claim it, but *H. virgata* in some places appears to its exclusion ; it likewise affects the most inland localities, from one of which, near Portarlington, I have specimens so large as 9 lines in diameter. An exception to the more ordinary places of its occurrence may be mentioned ; the ruins of Dunluce Castle, situated on the summit of an insulated mass of rock, considerably elevated above the sea. In localities in the North, but a few miles distant, and in every respect presenting a similar appearance, I have remarked the specimens in the one to be without exception either uniform in colour or very faintly banded, and in the other not one to be of an uniform colour, but all banded, and almost every individual darkly so. Draparnaud's *H. cespitum*, β. pl. 6, f. 15, 17, and Pfeiffer's *H. cespitum*, taf. 2, f. 24, and β. f. 25, are all very characteristic figures of our *H. ericetorum*, as is Rossmassler's var. f. 516. This author's *H. ericetorum*, f. 517, *a.* and *b.*, likewise represent it. My friend Prof. Forbes informs me that in the Museum at the Jardin des Plantes, Paris, he in 1838 saw a young

shell of this species, marked "*H. revelata*, Belfast," and as presented by M. Michaud; it is doubtless one of a series of specimens, which, considering them to be *H. ericetorum*, I had the pleasure of sending to this naturalist some time before.

Mr. O'Kelly of Dublin, to whom the shell belongs that was described and figured by Capt. Brown in the Wernerian Memoirs as *Helix elegans*, and in his "Illustrations," &c., as *Carocolla elegans*, always considered it as an extraordinary state only of *H. ericetorum*, and as such noticed it in the Dublin edition of Pennant's Brit. Zool., vol. iv. p. 368, ed. 1818. To the same specimen Dr. Turton applied the term *Helix disjuncta*, Conch. Dict. p. 61, f. 63; in his Manual (p. 40) this author places it under *H. virgata*. See also Gray, Man. p. 161.

H. rotundata, Mull.

This very distinct and handsome species, both in form and colour, is common and universally distributed in Ireland. It affects situations varying from very dry to very wet, and may be found on rocks, under stones, fallen leaves, &c., but seems rather to show a predilection for decaying wood. I have more than once detected the *H. rotundata* in company with *Limaces* banqueting on some of the larger *Fungi*.

Specimens presenting much convexity are unfrequent, but in Shane's Castle Park (County Antrim) a full-grown one has occurred to me, whose height was equal to its diameter. At Holywood House (County Down) I once obtained two specimens of the beautiful crystalline variety. The young of this species differ very much in form from the adult, in being quite flat above and very convex beneath. In the stomach of a blackbird (*Turdus Merula*) I once found ten full-sized specimens of this shell, in addition to five of *Achatina lubrica*.

H. umbilicata, Mont.,

Is commonly distributed throughout the southern three-fourths of Ireland, more especially over the great limestone belt which traverses the country:—at its eastern commencement, near Dublin, and at its extreme western verge, where it dips into the ocean, in the South Islands of Arran, I have found this species in equal abundance.—Glenarm and Garron Point, 1842. W. T., Scrabo, Co. Down, 1843.

This *Helix* attaches itself more to one kind of rock—limestone—than any species hitherto treated of. With reference to what Montagu says of its habits, it may be remarked that I have commonly collected specimens on limestone debris resting on the ground, and on loose stone walls or dykes. I have not seen any Irish specimens agreeing with Draparnaud's figure in tapering to the apex; but all were of his var., "β. testa subdepressa, umbilico latiore." Mr. Gray's figure, as above quoted, is characteristic of this form; in the 1st ed. of Turton's Manual the other form was given. It is Drap. var. β. only that Mr. Jeffreys quotes (Linn. Trans. vol. xvi. p. 343), and it is this which Montagu describes; his figure does not well represent either form.

H. pygmæa, Drap.

This species, so interesting from its minuteness, is indigenous to the more northern two-thirds of Ireland from East to West, and doubtless will be found by him who searches properly for it in the South. It is partial to shade and moisture; under stones in pastures it may be procured, but is most readily and frequently obtained on fallen leaves, &c., in plantations. Since the Mollusca first claimed my attention in 1832, this *Helix* has

occurred to me in very numerous localities throughout the Counties of Down and Antrim, in the County of Londonderry, and in the glen of the Downs in Wicklow. By Dr. Harvey it was sparingly found several years ago on the marine sand-hills at Miltown Malbay (County Clare); more latterly by Mr. E. Waller, of Dublin, at Annahoe (County Tyrone), and Finnoe (County Tipperary); and by the Rev. B. J. Clarke, near Portarlington (Queen's County). At Twizel House, Northumberland, and Ballantrae, Ayrshire, I have collected this species. Draparnaud's description and figure of *H. pygmæa* are most characteristic.

H. alliaria, Miller,

Although not an abundant species anywhere, is generally distributed over Ireland and her islands. From under stones at the sea-side to a great elevation on the mountains,—as near the summit of Divis, the highest of the Belfast chain; of Altavanagh, one of the mountains of Mourne, in Down; and of Ben Bulben, in Sligo, I have met with it;—all situations, from the exposed sea-shore and mountain-side to the umbrageous wood, seem alike to it. A greenish-white variety, and the shell strong, is much more common in Ireland than the yellow, which is ranked the ordinary state; from under the same stone I have procured specimens of both colours. The animal is blackish. M. Michaud remarked, on acknowledging Irish specimens from me, that they were *H. nitida*, Drap., junior.

H. cellaria, Mull.,

Is common, and distributed over Ireland. It has a predilection for wet situations, and even from the bottom of drains, partially covered with water, some of my largest specimens were procured in the North; the very largest Irish specimens—7½ lines in diameter—I have seen were found in drains within the city of Dublin, by Mr. T. W. Warren, to whom I am indebted for them. From the stomachs of the blackbird and starling I have taken perfect specimens of this shell.

H. pura, Alder,

Is distributed over Ireland; it is usually found in moss, under stones, &c., in sheltered situations, but on sea-side pastures likewise I have met with it. The yellowish horn-coloured variety has in all parts of the country occurred to me more commonly than the hyaline shell; the closely set, regular, and fine striæ render recent shells of this species very beautiful. M. Michaud, on acknowledging Irish specimens of *H. pura*, observed that they were *H. nitidula*, Drap.

H. nitidula, Drap.

This species, most characteristically described by Mr. Alder (Newc. Trans., vol. i. p. 38), is common, and generally distributed over Ireland. In the North I have found it chiefly among mosses in glens and sheltered places. From two localities in this country I have seen *Helices* of crystalline transparency, and in form intermediate between *H. nitidula* and *H. alliaria*.

H. radiatula, Alder.

This polished and well-marked species at every age—for when very young the regular and strongly-marked striæ serve to distinguish it—has, since 1832, occurred to me in the County of Londonderry, in the neighbourhood of Dublin, and in very numerous localities throughout Down and Antrim. I have seen specimens which were collected at Anna-

hoe (Co. Tyrone) and at Finnoe (Co. Tipperary), by Edward Waller, Esq.; at La Bergerie (Queen's County), by Mrs. Patterson and the Rev. B. J. Clarke; and in the neighbourhood of Cork, by Miss Hincks. In the North of Ireland the transparent greenish-white var., *H. vitrina*, Fér., as often occurs as the deep yellowish horn-coloured shell. That this *Helix* is more widely distributed in this country than would appear from the above notes, I have no doubt. At Dovedale, in Derbyshire, and Ballantrae, in Ayrshire, I have met with it, and by Dr. W. H. Harvey have been favoured with specimens which he collected at the Falls of Clyde in 1832. In moist spots, in the wildest and bleakest localities, as well as in "woods," I have procured it. In the stomachs of four out of seven starlings (*Sturnus vulgaris*), brought to a bird-preserver in Belfast at different periods during one winter, I found specimens of this shell, of which some were very fine and perfect. M. Michaud, when acknowledging specimens which I sent him, remarked that they were a var. of *H. nitidula*, Drap.

H. lucida, Drap.

The *H. lucida* described and figured by Draparnaud, and characterized by Mr. Alder in the Transactions of the Natural History Society of Newcastle (vol. i. part 1, p. 38), appears to be in Ireland, as in England, according to the latter author, "rare," and rather a local species. In the rejectamenta of the rivers Lagan and Blackstaff, near Belfast, I, in 1833, obtained a few individuals, and in Kilmegan bog (County Down) have since procured a series containing the living animal. I have seen specimens which were collected near Portarlington by the Rev. B. J. Clarke, and at Finnoe, in the North of Tipperary, by E. Waller, Esq. Our specimens differ in no respect from English supplied me by Mr. Alder, and are identical with others from Dauphiny, marked "*H. lucida*, Drap.," by Michaud, to whom I am indebted for them.

H. excavata, Bean.

Of this handsome shell I have yet seen but a single Irish specimen, which was obtained at Dunscombe Wood, near Cork, by Miss King, of that city. On being shown to the Rev. T. Hincks, he at once identified it with *H. excavata*, and, with the kind permission of the owner, sent it to Belfast for my inspection; it in all respects agrees with English specimens of this *Helix* favoured me by Mr. Jeffreys and Mr. Alder.*

H. crystallina, Drap.,

Is generally distributed in Ireland, occurring in moss, under stones, upon decaying wood, &c., in dry and wet situations, though in the latter more frequently. Some adult specimens which I have collected have had but $3\frac{1}{2}$ volutions instead of $4\frac{1}{2}$ or 5, the ordinary number. Extensively as I have collected this *Helix* in Ireland, none but dead specimens would come under Draparnaud's var., "*β eburnea subopaca*." The animal is of a white colour.

Mr. Alder's views in reference to the last eight species (*Hyalinæ*, Fér.) are here adopted; but even the British species and their varieties belonging to this division seem not yet to be satisfactorily cleared up. The

* *Helix excavata*, Bean, previously noticed as Irish from a specimen found at Cork, was obtained by me near Clifden, County Galway, in July, 1840; and subsequently in the island of Interlacken, near Roundstone, by Mr. Barlee. Dunscombe's Wood, near Cork, Miss King.

application of the same name, too, by British and continental authors, to different species, adds much to the confusion. Ireland possesses all the British species as distinguished by Mr. Alder, viz. *H. cellaria*, *H. nitidula*, *H. lucida*, *H. excavata*, *H. alliaria*, *H. radiatula*, *H. pura*, *H. crystallina*. Rossmassler's *H. nitens*, f. 524 and 525, are very characteristic representations of shells I possess from different parts of Ireland, and with his *H. glabra*, f. 528, so far as a figure and diagnostic description will suffice for judgment, I have specimens identical.

Genus SUCCINEA.

S. putris, Flem.,

Is generally distributed throughout Ireland. Specimens agreeing with the var. β of Draparnaud—"major solidior, colore carneo"—in form (see pl. 3, f. 23), colour, and more than ordinary thickness, though not in being larger than usual, are occasionally met with. The varieties γ ("media magis elongata et colorata") and δ ("minor, apertura ovata") are found in the North. Individuals of this species, which adhere to stones in wet spots at a considerable elevation in the northern mountains, are, as may be expected, invariably much dwarfed in size.

S. Pfeifferi, Rossm.

Although less common than the last, this species or variety is widely diffused over the island. In the North it is not uncommon, and is here generally of the same amber colour as *S. amphibia;* as likewise are English specimens, which I owe to the kindness of Mr. Alder; specimens of a reddish horn-colour, and much thicker than usual, have occasionally occurred to me in the North, and in quantity they have been obtained by Mrs. Patterson, of Belfast, near Portarlington. Mr. Humphreys notices this shell under the name of *S. oblonga*, Turt., as found about Cork, and by this appellation Dr. Harvey mentions Ballitore (County Kildare) and Limerick as habitats, adding at the same time—"animal darker than in the last [*S. amphibia*], and found in far wetter places." From Finnoe (County Tipperary) I have been favoured by Mr. E. Waller with typical specimens of this *Succinea*, as admirably represented in Gray's Manual (f. 74).

S. oblonga, Drap.

Bishop's Crook, Cork, Messrs. Wright and Carroll. Baltimore, Co. Cork, Mr. M'Andrew.

Genus BULIMUS.

B. obscurus, Drap.

This species is very local. In his Irish Testacea Capt. Brown notices "one specimen [procured] on a dry mud wall near Clonooney," p. 529. About the roots of trees in the demesne of Woodlands, near Dublin, I have, accompanied by Dr. R. Ball, obtained specimens, the shells of all of which, adult as well as immature, were like those sent me from other localities, and, according to the observations of authors, covered with earth. From La Bergerie, Portarlington, I have been favoured with specimens by the Rev. B. J. Clarke. In March, 1837, it was supplied me in quantity from Larne, County Antrim, by Mr. James Manks. From the Falls of Clyde (Scotland), I have specimens collected by Dr. W. H. Harvey.

Animal, rather dark grey above, lighter towards the disk, and when

viewed under a lens appearing closely marked all over the back and sides with darker spots and markings so disposed as to render it very beautiful; disk very pale grey. Tentacula cylindrical, stout, and club-shaped; the upper of ordinary length, the lower short.

B. acutus, "Brug."

This is a local species, but found from North to South—from the neighbourhood of the Giant's Causeway to Youghal. It is especially common on sea-side sand-banks and pastures, but in remote inland localities is likewise native. It would seem to be more common to the eastern than the western portion of the island, but in the latter it has occurred to me about Ballyshannon, County of Donegal, also at Dunfanaghy, Larne, and Springvale, Co. Down. I have occasionally observed this species inhabiting the crevices of walls at a considerable height, as those of Howth church, County Dublin. M. Michaud remarked on some Irish specimens of this most variable species which I contributed to his collection, that they were the *B. articulatus*, Lam.

B. lubricus, "Brug.,"

Is common, and generally distributed over Ireland. From under stones on the dry mountain-side at Wolfhill, near Belfast, and on sea-side pastures I have obtained a few specimens of a handsome variety, of a pale grey colour, and transparent, with a white peristome; in such localities this shell does not present to the same degree the rich amber colour and brilliant polish which it does in woods or shady places. The animal is blackish. From an examination of the food contained in seven starlings (*Sturnus vulgaris*), shot at different places in the North of Ireland, from the month of December to March, during a mild winter, it would appear either that the *B. lubricus* is a special favourite, or that its haunts are similar to those of the bird; as six of the starlings, in addition to *Helices* and other food, contained specimens of this shell varying from five to thirteen in number.

Genus ACHATINA.

A. Acicula.

This handsome species is found sparingly, but from East to West, in the more southern half of Ireland. Dr. W. H. Harvey has procured it on the "sand-hills, Miltown Malbay, and from under stones near Limerick," but in the latter locality marks it as "very rare." Mr. T. W. Warren of Dublin has supplied me with specimens procured by him on different occasions in the rejectamenta of the river Dodder, near that city. At La Bergerie (Queen's County) it is found by the Rev. B. J. Clarke; and at Finnoe (County Tipperary), by Mr. Edw. Waller; by Miss Ball at Castle-martyr demesne (County Cork); and by Miss M. Ball at Dromana (County Waterford).

For the *Cionella elongata*, Jeff., noticed with doubt as Irish by Mr. Jeffreys, Linn. Trans. vol. xvi. p. 348, see Gray's Manual, p. 18, under *Achatina octona.*

Genus PUPA.

P. umbilicata, Drap.

This is one of the most common of the testaceous Mollusca throughout Ireland and her islands, and especially abundant where limestone and chalk prevail. From the sea-shore to a great elevation in the mountains

it is found. It is subject to considerable variety in form and colour; the toothless var. not unfrequently occurs, and on a sea-bank at Belfast Bay I once obtained a specimen with two teeth, but, differing in no other respect from the ordinary shell, I cannot consider it otherwise than an accidental variety of *P. umbilicata*. Specimens whitish and opaque, like "dead shells," not unfrequently occur containing the living animal. Occasionally in the North, at the South Islands of Arran, and about the lakes of Killarney, I have procured a few individuals of a crystalline transparency, the elegance of their appearance being much enhanced by the pure white margin of the peristome. The animal is of a very pale grey colour.

P. Anglica, Alder.

This species, considered peculiar to England when described by Férussac, and in the very latest work treating of the British land Mollusca having only the localities "North of England, Northumberland, Lancashire" attributed to it, is found in the North and South, in the East and West, of Ireland; but at the same time is by no means general, or, except in particular spots, plentiful, like *P. umbilicata*. Under stones, on marsh plants, in wet moss, &c., it harbours. I first met with it in June, 1833, in the County of Londonderry, at the side of the river Bann, near its junction with the ocean; in numerous localities throughout Down and Antrim, and in the demesne of Florence Court, County Fermanagh, it since occurred to me; in the West, on the mountain of Benbulben in Sligo; in the South, about O'Sullivan's cascade, at the lower lake of Killarney; and in the East, in the glen of the Downs, County Wicklow. Dr. W. H. Harvey obtained this species "near Ballitore, and on the sand-hills, Miltown Malbay," but notes it as very rare. In the collections of Mr. T. W. Warren and Mr. Edw. Waller, of Dublin, are specimens procured by the former gentleman at Ardmore (County Waterford), and in the neighbourhood of the metropolis; and by the latter at Annahoe, County Tyrone; and at Killanella Wood, Co. Galway, close to Loch Derg;—near Portarlington it is found by the Rev. B. J. Clarke, and by the Rev. T. Hincks near Cork, where it is "abundant in wet moss." In England I have collected the *P. Anglica* at Twizel House, Northumberland; in Scotland, about Ballantrae, Ayrshire.

The shells of this *Pupa* commonly vary in colour from pale greyish-brown to a deep reddish shade of this colour, and are rarely of a glassy transparency; the margin of the mouth and teeth are generally of the colour of the shell, but sometimes pure white. Mr. Gray, having had the opportunity of consulting the work only of M. Michaud, refers his *Pupa tridentalis* with doubt to this species, but from having been favoured by its describer with specimens of this shell from the neighbourhood of Lyons, I can state with certainty that it is entirely distinct from *P. Anglica*, and a species unknown as British. Mr. Gray makes Pfeiffer's *Pupa bidentata*, 1, 59, t. 3, f. 21, 22, synonymous with *P. Anglica*, but, judging from the diagnosis and figures, I cannot think them the same.

P. marginata, Drap.,

Is common, and, although not generally diffused, is found from the extreme North to South, and East to West, of Ireland. It is particularly partial to the sand-hills or pastures bordering the coast, and to marine islets, as those in Strangford Lough; in the inland parts of the country it likewise occurs. The tooth is rarely visible: specimens containing the living animal are not unfrequently of a whitish colour.

Genus VERTIGO.

V. edentula, Alder.

This species is found from North to South of Ireland. Since September, 1832, I have met with it in numerous localities throughout the Counties of Down and Antrim, at the glen of the Downs in Wicklow, and in shell-sand from Portmarnock (County Dublin), Annahoe, (County Tyrone), and near Finnoe, (County Tipperary), Mr. E. Waller—La Bergerie, Queen's County, Mrs. Patterson (of Belfast)—neighbourhood of Cork, Rev. T. Hincks. The typical form of *V. edentula* I generally find under stones; the elongated and cylindrical variety in woods—in autumn and winter this latter is most readily obtained on the fallen leaves of trees; in summer, on the under side of the fronds of ferns (*Aspidii*, &c.), the shell and plant, though the naturalist only will perceive the former, being in beauty equally attractive. The elongate variety has seven, and occasionally even eight, volutions, and attains the length of 1½ line; when of this size, the animal, so very minute relatively to the shell, has a grotesque appearance when bearing this along, which is carried singularly erect, not more out of the perpendicular than the leaning tower of Pisa! This variety, judging from description and figures, is perhaps the *Pupa inornata*, Michaud, Comp. p. 63, pl. 15, f. 31, 32, apparently differing from it only in size—it is described to be 2 lines in length; my largest specimen is 1½ line, but this discrepancy is not greater than might be anticipated between individuals obtained in the North of Ireland and at Lyons, where the *P. inornata* was discovered. I at first thought this var. might be *Pupa muscorum*, Drap. (Phil. Mag. 1834, p. 300), but specimens of this shell from Montpellier, since sent me by M. Michaud, prove that it is not so—these are identical with examples of *Pupa cylindrica*, which I have collected at Salisbury Craigs, near Edinburgh, a locality in which this rare species was discovered by Prof. E. Forbes.

V. pygmæa, Fér.

This is the most widely distributed species of *Vertigo* over Ireland occurring throughout the country. It is generally found but sparingly where it does prevail, and is most easily procured under stones, both in dry and wet situations, from the sea-shore to a high elevation in the mountains. The usual number of teeth is four, of which one is central on the upper or body portion.—On a sea-bank, Belfast Bay, I once met with a *Vertigo* resembling the ordinary *V. pygmæa* in every respect, but with the addition of a tubercle, about the size of one of the teeth, placed *outside* the mouth and near the junction of the outer lip with the body volution. Animal dark lead colour, or rather blackish-grey above, disk blackish-grey anteriorly, becoming suddenly paler, so as to be nearly white at the opposite extremity.

V. substriata, Alder.

This species, though rare, has a wide distribution in Ireland. In the glen at Holywood House (County Down), I obtained specimens in 1832, and subsequently in shell-sand from Portmarnock (County Dublin). Dr. W. H. Harvey gives as habitats "Miltown Malbay, and near Limerick—rare at Ballitore (County Kildare)." In the neighbourhood of Ballantrae, Ayrshire, this *Vertigo* has occurred to me. Reference alone to Montagu's specimens would seem to prove whether his *Turbo sexdentata*, p. 337, be this species, as his description is partly applicable to this (in number of

teeth) and partly to *V. palustris* (in being smooth)—the locality in which it was found would be more suitable to the latter: the figure in Testacea Britannica throws no light upon the subject.

V. palustris, Leach.

In numerous localities throughout the Counties of Down and Antrim I have since 1832 procured this well-marked species, which, as its name denotes, is an inhabitant of the marsh; it nevertheless seems invariably to be not only free from dirt but presents a high polish. By the Rev. B. J. Clarke the *V. palustris* has been obtained near Portarlington, and by Mr. Edw. Waller, at Finnoe, Tipperary. In England I have procured it near Twizel, Northumberland, and in Scotland in several localities around Ballantrae. Mr. Gray, in the Introduction to his edition of Turton's Manual, mentions the *V. palustris* and *V. angustior* to "have been only yet recorded as found near London, and in the West of England," p. 37; in 1834 I published both species as indigenous to Ireland, Phil. Mag. 1834, p. 300. Reference to this communication, though a mere list of species of land and fresh-water mollusca, previously unrecorded as Irish, would have shown that several species noticed in the Manual as local have a considerable range of distribution.

V. pusilla, "Mull.,"

Is very rare, but has been found in the North-East and West of the island. From under a stone on a dry bank in Colin Glen, near Belfast, I obtained a specimen in 1832, as Mr. Hyndman did in an adjacent glen some time afterwards; in shell-sand from Portmarnock I have detected it, and Mr. Harvey has supplied me with a specimen from Miltown Malbay, where he states the species is very rare. Borrisakane, Mr. Waller, 1847, Kenmare, Mr. Barlee, 1845. A shell from Flanders, favoured me by M. Michaud, under the name of "*Pupa Vertigo*, Drap. (*Vert. pusilla*, Mich.)," is identical with that under consideration.

V. angustior, Jeffreys.

In 1833 I was favoured by Dr. W. H. Harvey with specimens of *Vertigo*, labelled "*V. heterostropha, two species*, from the sand-hills, Miltown Malbay, the smaller common, the larger very rare." The smaller are of this species, which has always seemed to me distinct from the *V. heterostropha* of Drap. and of Turton's Manual. A comparison of Montagu's *Turbo Vertigo* (tab. 12, f. 6) with the *V. heterostropha* in the works just mentioned, will show the obvious difference. To Mr. Jeffreys the merit is due of clearly distinguishing these species. Since 1834, when this *Vertigo* was published as indigenous to Ireland, I have not obtained any more information respecting it. Since found at Bundoran.

Genus BALÆA.

B. perversa, Flem.

This species is generally distributed over the island. Its favourite abode is on the stems and branches of trees, where it shelters itself beneath the loose bark or in its crevices; and on trees whose bark from smoothness will not afford it shelter, this *Balæa* lurks in the mosses and lichens which adorn them—in the tufts of these cryptogamous plants I have remarked it buried, whilst the *Vertigo edentula* displayed itself at the outside.

Genus CLAUSILIA.

C. bidens, Drap.,

Is a rare and local species in Ireland. The first native specimens I have seen were in the collection of Mr. T. W. Warren, of Dublin, who had procured them in Belamont Forest, near Coothill, County Cavan. A few specimens obtained by Mr. Callwell, on Hare Island, in the Shannon (L. Pree) above Athlone. In Sept., 1837, I had the gratification of seeing numbers of this fine *Clausilia*, after heavy rain, ascending the stems of the stately trees in the demesne of Florence Court, County Fermanagh, the seat of the Earl of Enniskillen. At Dovedale, in Derbyshire, I have met with it.

C. nigricans, Jeffreys,

Is very commonly distributed over Ireland and the surrounding islands. It is an extremely variable species, in being more or less ventricose, in the striæ being obscure or prominent, in the form of the mouth, and occasionally even in the number of internal lamellæ—the largest specimen I have found in the neighbourhood of Belfast is 7¼ lines in length, and has thirteen volutions; several others of the usual length of 6 lines have likewise this number. The colour commonly varies from a very pale greyish-white to deep reddish-brown; very rarely specimens of a glassy transparency occur, and in such of these as I have found the animal was equally colourless. To Mr. Gray, Mr. Alder, and Mr. Forbes I have shown the specimens differing as here described, and they agree with me that they must all be considered *C. nigricans*.

Family "AURICULADÆ."

Genus CARYCHIUM.

C. minimum, Mull.

This minute species is commonly distributed over Ireland, and may be found in moss, on decaying leaves and wood, under stones, &c., in dry as well as wet places, though the latter are its favourite abode; in the North of the island specimens rarely attain one line in length.

Genus ACME.

A. fusca, Gray,

Is rare in Ireland, but is widely distributed, being found over the island. Dr. W. H. Harvey was the first to find and distinguish this species as a native—he notes it as not uncommon on the sand-hills in Miltown Malbay, where in 1826 he procured both the ordinary form and the variety with the spires reversed. This shell has been procured by Mr. Hyndman and myself in various localities in the Counties of Down and Antrim, but not more than three or four individuals have been obtained on any one occasion. I have more than once found this shell, containing the living animal, under stones on bare clayey banks, in which situations the only other mollusc met with was *Helix crystallina*. At Annahoe (County Tyrone) Mr. Edw. Waller has obtained the *A. fusca* (both *a.* and *b.* Turton, p. 83); as Mr. T. W. Warren has done in the neighbourhood of Dublin, and the Rev. B. J. Clarke at La Bergerie, Queen's County. The Rev. T. Hincks of Cork favours me with two southern habitats—Ballinhassig Glen (County Cork) and near Mucruss, Killarney (County Kerry).

Genus AURICULA.

A. denticulata, Mont. (sp.).

Bangor, Miss A. M'Adam;
Youghal, Miss M. Ball;
Portmarnock, Mr. Warren.

A. bidentata, Mont. (sp.).

General along the coasts of Ireland.

A. fusiformis, Turt. (sp.).

Mr. Alder, on examination of a shell from Portmarnock, in Mr. Warren's collection, agreeing with the description of *Voluta fusiformis*, was disposed to believe it worthy of specific rank: a similar shell was obtained at Bundoran by Mrs. Hancock.

Family LIMNÆADÆ.

Genus LIMNEUS.

L. auricularius, Drap.

Through deference to those who have paid much more attention to the subject than myself, I note this *Limneus* under the head of a distinct species, although I am disposed to believe that it is only an extreme form of *L. pereger*. The *L. auricularius*, as figured in both editions of Turton's Manual, and by Draparnaud, is not very unfrequent in Ireland, but of the extremely expanded form represented by Rossmassler is very rare, and from one or two still ponds only, abounding in subaquatic plants of various species, have I seen it. Pfeiffer's figure (part i. t. 4, f. 17, 18) is somewhat intermediate between those just mentioned, and corresponding to it I have procured specimens. All forms, from the ordinary *L. pereger* to the *L. auricularius*, it seems to me, may be closely traced blending into each other—reference to the figures in many works will be found to present various forms, though in all the aperture is greatly expanded. Some specimens of *L. auricularius*, which I collected in Stow Pool, Lichfield, in July, 1836, are more distinct than any which I have seen represented; the spire is more minute, and the upper part of the outer lip goes off from the body of the shell in the form of a straight line; but of all the individuals obtained on this occasion no two are precisely alike, but vary from the extreme form described to the *L. ovatus*, Drap.

L. pereger, Drap.

This species, presenting endless variety, is abundant throughout the waters of Ireland, from the smallest drain to the vast expanse of Lough Neagh. Some of the forms which have been considered as distinct species may be enumerated as occurring in this country, as *L. ovatus*, Drap., *L. intermedia*, Michaud (Comp. pl. 16, f. 17, 18), *L. marginata*, Mich. (Id. f. 15, 16), *L. lineatus*, Bean, *L. acutus*, Jeffreys—of these two last I judge from comparison of authentic specimens, the former favoured me by Mr. Alder, the latter by their describer. One variety seems to require especial notice—the *Gulnaria lacustris*, Leach. On the shores of Loughs Neagh and Erne I have collected specimens identical with those so named by Dr. Leach in the British Museum, and which are from the lakes of

Cumberland—their donor General Bingham. It would seem to be the same form which Capt. Brown figures under the name of "Lymnæa lacustris, Brown's MSS.," and states to have been found by him in Loch Leven, Kinross-shire. Illustrations Brit. Conch., pl. 42, f. 24, 25. From lakes in various parts of Ireland I possess this form, which, from its extreme delicacy, I look upon as an inhabitant of still water, and from its rare occurrence, except when cast ashore, of deep water also. The specimens which, containing the living animal, have occasionally been found in shallow water have, I presume, been driven thither in storms, to which conclusion I am led by having once at Lough Erne, and frequently at Lough Neagh, looked in vain for a living individual with a shell of this form at the edge of their waters, though plenty of the more common forms of *L. pereger* were there. The variety under consideration is intermediate in form between the typical *L. pereger* and *L. glutinosus*, with a short spire and ample aperture; shell very thin, longitudinally striated; striæ regular, frequent, and strongly marked; about one in thirty of the specimens examined, somewhat spirally cut, "like the facets of glass;" slight fold on the pillar lip; an epidermis-like covering, of a dull greenish-yellow colour. By the chief cultivators of this branch of natural history in Great Britain, to whom I have sent this shell, it was considered a particularly well-marked variety, and M. Michaud, in acknowledging the receipt of specimens from Lough Neagh, remarked that the form was unknown to him in France.

I have seen the *L. pereger* attached in numbers to the backs of turtles, kept in a pond at Fort William, near Belfast, when it was amusing to observe these animals swimming about, with the *Limnei* still keeping "their seats" upon them. Tory Island, Mr. Hyndman, August, 1845.

L. involutus, Harvey.

This *Limneus* so remarkable in form was discovered by Dr. Wm. H. Harvey, in a small lake on Crommaglaun Mountain, near the lakes of Killarney. A description of it will be found in the Annals Nat. Hist. for March, 1840, p. 22. Its specific character is—spire sunk within the outer whorl; aperture very large, extending to the apex.

L. stagnalis, Drap.

This, the largest European *Limneus*, though by no means generally distributed, occurs in every portion of the island. It differs very much in size, according to locality; mature specimens, which I have found in the cold water of Lough Neagh, where barren of subaquatic plants, did not exceed one inch in length, whereas in drains in which such plants abound they attain double this size.

A *Limneus* collected by my friend Richard Langtry, Esq., of Fort William, near Belfast, when on a tour through Upper Canada in 1835, seems identical with *L. stagnalis*. It differs from the ordinary form only in tapering rather more towards the apex, and in the second largest volution being a little more tumid; but in these respects an extensive series of Irish specimens before me differ very much. The American specimens were taken in the river connecting Buckhorn with Pigeon Lake.

L. palustris, Drap.

Common, and generally distributed over Ireland—in size, form, and colour very variable. In the river Bann, near Kilrea, I have procured

specimens of the ordinary colour, but with the addition of spiral narrow white bands—in some waters the different species of *Limnei*, &c., are so marked. A shell differing from the *L. palustris* in general proportion (being much shorter relatively to its breadth) and in colour (generally of a uniform pale yellow) is common to Lough Neagh and other lakes in Ireland: it is found attached to stones at the edge of the water, and where the adjacent bottom is stony, with very little vegetation—under similar circumstances it has also occurred to me in the first-named locality. It is identical with the var. β of Mr. Jeffreys, who has favoured me with specimens from Battersea, near London. The small size, different colour, and freedom from all adventitious matter, I should be disposed to attribute to the colder water and less food, in such localities, than in the ponds and ditches, in which the ordinary form prevails.

L. truncatulus, Jeffreys,

Is generally distributed over Ireland. It inhabits drains, ditches, &c., like the *L. palustris*; but in moist spots, and about springs, at a considerable elevation in the northern mountains,* is likewise found, and is here always of a very small size. In July, 1833, when accompanied by Mr. Hyndman, I remarked many of this species alive, and adhering to stones which lay dry upon the shore of Lough Neagh, far above the summer level of its waters,† these were of uniform size, very small, and when containing the living animal of a very dark reddish-brown colour. Many varieties of the *L. truncatulus* have occurred to me in Ireland; among them was one very much elongated, and another with regular longitudinal striæ, the latter of which is well remarked by Dr. Turton to be "very elegant."—*Man.* p. 125.

L. glaber, Gray.

I have not seen any Irish specimens of this *Limneus*, which is thus noticed in the supplement to Mr. Jeffreys's paper in the Linnæan Transactions, vol. xvi. p. 520: "Ireland, Rev. James Bulwer." On inquiry of Mr. Bulwer, he stated that the shell so noticed was considered by him but a variety of *L. palustris*. By a letter from Mr. Jeffreys, dated June 8, 1840, I learn that "*L. elongatus* was mentioned as Irish on the authority of the late Dr. Goodall, who stated that he had received specimens from Mr. Bulwer." Mr. Jeffreys adds, "I have, however, two or three undoubted specimens among a collection of Irish shells, which I purchased about three months ago from Mr. John Humphreys of Cork—the tray which contained them was labelled 'Cork.'" From Mr. Humphreys I learn that he had not identified the species, but that the note of locality appended to the shells alluded to by Mr. Jeffreys, was strictly correct.

Genus ANCYLUS.

A. fluviatilis, Mull.

This species is distributed over the island, and is equally found attached to stones in the mountain torrent, the river, and the still waters of the lake. The var. described by Montagu (p. 483) as being strongly striated,

* In such places it is preyed on by the lapwing (*Venellus cristatus*), from whose stomach I have taken it.

† Montagu has, on the contrary, remarked that when left dry the animal perishes.—*Test. Brit.*, p. 372.

and by Jeffreys (p. 390) as being pellucid, &c., I find upon the first stones wet by mountain springs, on their gushing from the earth. All the specimens from these localities are much smaller than those found in still water, and coated with green vegetable matter, which is entirely adventitious, and may be seen in like manner coating the little prominences of the stone to which the *Ancylus* adheres; this and the animal being removed, the shell is crystalline. Under the name of "*Ancy. fluviatilis*, Drap. var. montana," M. Michaud has favoured me with specimens from the Pyrenees, quite identical with the var. just noticed, as, it need hardly be remarked, are others from France with the ordinary form.

I had often observed that beautiful and graceful bird the grey wagtail (*Motacilla boarula*) feeding about the mountain springs, but was not aware of its propensity for mollusca, until, on opening the stomach of one without knowing where the specimen had been killed, I found it to be filled with shells of this species, all of which being of the var. *a.* afforded evidence whence they had been procured.

Animal bluish-grey beneath; portion which comes in contact with the shell blackish-green. Of six specimens which I once kept in a dry chip box for eighteen hours, two perfectly recovered on being immersed in water.

A. lacustris, Mull.

This species, although rare, has been met with in the North, East, and West of Ireland, in still and gently-flowing waters. It was noticed by Captain Brown in his Irish Testacea as "plentiful in a mill-race a mile below Naas." By the late Mr. Templeton's MSS. I find that the species had been previously observed by him "on Potamogeton, &c., in the drains of the bog-meadows near Belfast." Between the fourth and fifth locks of the Lagan canal, a few miles from this town, I have, at the end of September, procured many specimens, all of which were on the under side of the leaves of the yellow water-lily (*Nuphar lutea*) and great water-plantain (*Alisma Plantago*)—Pond in the demesne at Moira, County Down, Mr. Hyndman—Near Limerick, Dr. W. H. Harvey—Beechwood, near Portmarnock, County Dublin, Mr. T. W. Warren—Glasnevin Botanic Garden, Dublin, Dr. Coulter—Finnoe, County Tipperary, and Derryadd Lake, County Armagh, Mr. Edward Waller.

Genus PHYSA.

P. fontinalis, Drap.,

Is common, and generally distributed over Ireland, occurring on aquatic plants in stagnant and gently-flowing water. It is subject to considerable variety.

P. hypnorum, Drap.,

Although much less common than *P. fontinalis*, is generally diffused over the island, and found as frequently in very shallow as in deep water.

Genus PLANORBIS.

P. corneus,

Has been found only within a very limited portion of the island. It still prevails in the locality recorded by Capt. Brown—near Maynooth,

in the County of Kildare. From about Naas in the same County I have been supplied with specimens by Dr. R. Ball; and by the Rev. B. J. Clarke with some obtained by him near Lea Castle, Queen's County. County Kerry, Dingle, Rev. D. Foley, 1842.

P. albus, Mull.,

Prevails generally over Ireland. Specimens of *P. glaber*, Jeffreys, which I owe to the kindness of their describer, seem to me (as to Mr. Alder) identical with *P. albus*.

P. lævis, Alder,

Is found in the North-East of the island. Early in the winter of 1832 I obtained a number of this species on aquatic plants (especially *Callitriche aquatica*), with *P. imbricatus*, in a small pond at the Falls, near Belfast, and about the same time procured others in the rejectamenta of the rivers Blackstaff and Lagan, in the same neighbourhood. In the demesne of Portavo, near Donaghadee, and also at Portmore, in the vicinity of Portaferry, localities in the County of Down; it has likewise occurred to me on Nymphæa and Potamogeton, 1846, Lang's Lake, near Clogher, Mr. Waller. The animal is dark grey; tentacula very pale grey —dead shells are white. It was the *P. lævis* which was marked with doubt as "*P. glaber?* Jeff." in Phil. Mag. 1834, p. 300.

P. imbricatus, Mull.

This handsome and well-marked species is known to me as occurring throughout Ireland, with the exception of the extreme South, where, however, there is little doubt that it exists. It is very variable in form—the varieties 1 and 2, and the "monstrosity with the volutions detached, and raised above each other" (Turt. Man.), I have procured on the same plant. The entire animal, together with the tentacula, are of a pale grey colour.

P. carinatus, Mull.,

Is much less common than *P. marginatus*, but found in all portions of the island; in the earliest catalogues it was inserted as indigenous. In the neighbourhood of Portaferry, County Down, and about the city of Dublin (a recorded locality), it has occurred to me. I have seen specimens which were obtained near Portarlington by the Rev. B. J. Clarke; at a lake near Tyrrell's Pass, Westmeath, by Mr. Ovens; and at Lough Gounagh (County Longford) by Mr. R. Callwell of Dublin.*

In 1833 Dr. W. H. Harvey favoured me with specimens labelled "*P. planatus*, Turt. Man.," from Portumna on Lough Derg, an expansion of the Shannon, where he stated that the form was frequent, noting it at the same time to have been found by him at Ballitore (County Kildare), where it is very rare; these shells correspond exactly with Turton's description of *P. planatus*, Man. p. 110. This seems to be the common form (though the normal one does likewise occur) at Lough Derg, as testified by specimens since obtained from Portumna and Killaloe, near its northern and southern extremities; some from Nenagh (County Tipperary) have been kindly submitted to my inspection by the Rev. T. Hincks of

* The size is, I conceive, attributable to the coldness of the water and scarcity of subaquatic plants.

Cork; near this city the "*P. planatus*" is noticed by Mr. Humphreys as met with. Mr. Alder and Mr. Forbes consider the Lough Derg shell *P. carinatus*, and, according to the former, it is the *P. disciformis*, Jeff.

P. umbilicatus, Mull.

This species prevails in every quarter of the island, but is not generally distributed. Finnoe, County Tipperary, Mr. Waller. Attached to stones at Ram's Island, Lough Neagh, I find a small variety, about half the ordinary size, and which is concave beneath, with the keel obscure. Mr. Alder remarked on some of these which I had the pleasure of adding to his collection in 1835—"Turton's *P. rhombæus*, of which he sent me specimens, is the same thing in a younger state." Mr. Jeffreys, in a letter dated Oct. 2, 1838, when acknowledging the receipt of the Lough Neagh shell, observed that he considered it distinct from *P. marginatus*, and that from a similar shell previously found at Cardiff he had named the form *P. inæqualis*. It is to a distorted individual of the *P. marginatus*, found in a pond at the College Botanic Garden, Dublin, that Capt. Brown applied the name of *Helix cochlea* (Irish Test., p. 528, pl. 24, f. 10), and Turton that of *Helix terebra* (Conch. Dict., p. 62, f. 55).—Mr. O'Kelly, to whom the shell belongs, always considered it *P. marginatus*, and as such noticed it in the Dublin edition of Pennant's Brit. Zool., p. 363. The Rev. T. Hincks writes me from Cork that "the var. of *Plan. marginatus* with the volutions elevated into a spiral cone was once taken in Ballypheane bog." I have myself met with monstrous forms of several of the native species of *Planorbis*.

P. vortex, Mull.

Generally distributed.

P. spirorbis, Mull.

The species which my correspondents (chiefly judging from the descriptions and figures in Turton's Manual) have considered as the *P. vortex* and *P. spirorbis* are noted as generally common in Ireland; these shells merge so into each other that I was in the habit of putting all that were collected throughout the North together. On comparing these with examples of "*P. spirorbis*" from the neighbourhood of Newcastle, and of "*P. vortex*" from that of London, presented me by Mr. Alder, I find that, although some of them are as large as the *P. vortex*, have seven volutions, and a carinated edge to the lower one, that they are not of the extreme form designated by this name, and consequently come under *P. spirorbis*; so likewise do a number of specimens from the neighbourhood of Portarlington sent me by the Rev. B. J. Clarke; those from the river Shannon, favoured me by the Rev. C. Mayne of Killaloe, may be placed under *P. vortex*, as may those also collected at Lough Gounagh, County Longford, by my friend R. Callwell, Esq., of Dublin. Is the more prominent keel, with other differences necessarily attendant on it, as form of mouth, &c., sufficient for specific distinction between *P. vortex* and *P. spirorbis*? Under *Planorbis disciformis*, Mr. Alder has well remarked, that "the degree of carination is so very variable in different individuals of the same species, that it is rather fallacious as a distinguishing character."—*Mag. Zool. and Bot.*, vol. ii. p. 113.

Specimens of *P. compressus*, Michaud, from Lorraine, with which I have been favoured by their describer, are identical with those of *P. vortex* before noticed as from Mr. Alder. Examples of *P. leucostoma*,

Michaud, with which I have been presented by this most liberal author, differ only from Mr. Alder's *P. spirorbis* in having a white rim within the mouth: on this subject see Supplement to Mr. Alder's Paper in the Newcastle Transactions, and Mr. Gray's edition of Turton's Manual, p. 267; in this work *P. leucostoma*, Mich., is referred to *P. vortex*, but if this is to be considered distinct from *P. spirorbis*, to the latter *P. leucostoma* must be referred.

P. nitidus, Mull.

Although somewhat rare, this species is distributed over Ireland. On some living specimens taken near Belfast in Dec., 1834, by Mrs. Hincks, and kindly sent to me, the following note was made—"tentacula moderate, or rather short and uniform in colour with the body of the animal, which changes with age, the adult (with shell 2½ lines in diameter) being black; younger individuals pale grey; the shells of the latter are much the more transparent." These animals seemed indifferent which side of the shell was uppermost, and when undisturbed often moved along with what is termed the under side next the surface of the water.

P. contortus, Mull.

Like the *P. albus*, generally distributed over Ireland, but of more frequent occurrence, and in greater quantity where found than that species.

P. lacustris, Lightfoot.

Cahir, County Tipperary, Mr. Humphreys.

Sect. II. OPERCULATA.

Family Cyclostomidæ.

Genus Cyclostoma.

C. elegans, Lam.

Dr. J. L. Drummond informs me, that when at Sandymount, near Dublin, in 1816, in company with Mr. Tardy, a well-known entomologist, he found one of these shells. In Dr. R. Ball's collection are specimens which were obtained in Glasnevin Botanic Garden, Dublin, but here they might have been introduced with plants from England; in the cabinet of Mr. O'Kelly of that city are two specimens found by himself at Portmarnock; by Mr. S. Wright of Cork I was shown a similar number, said to have been procured at Youghal. Notwithstanding this, I am not altogether satisfied that the *C. elegans* is an indigenous species; it has on different occasions been introduced to the country in the present century, but whether to any of the places mentioned previous to the specimens being found there I am uninformed—the fact of only one or two individuals occurring anywhere looks suspicious.

Dr. Turton states that he found a single shell of the *Cyclostoma producta* near the sea-coast in the West of Ireland.—*Manual*, p. 94.

Several specimens of this shell were found by Mrs. Hancock on the strand at Mullaghmore, near Bundoran, County Donegal.

ORDER PECTINIBRANCHIATA.

Family TURBINIDÆ.

Genus EULIMA.

E. polita, Linn.,

Has long been known as found on the southern coast (Bantry Bay), and of late years has been obtained by the dredge on the northern—by the collectors to the Ordnance Survey, about the entrance of Belfast Bay—by Mr. Hyndman from the same locality, and at a depth of perhaps 20 fathoms—by that gentleman and myself at Strangford Lough, at 8—10 fathoms; bottom pure sand in both localities; very few individuals occurred in any instance.

Var. *nitida*, obtained by Mr. Barlee on the coast of Galway, in 1848, according to a communication received from Mr. Jeffreys.

E. subulata, Don.

Dredged from a sandy bottom, 8—10 fathoms, off Dundrum, Co. Down, Mr. Hyndman and W. T.; from 12 fathoms, Birterbuy Bay, Dr. Farran; Dublin and Youghal, in the stomach of *Bulal lignaria*, Dr. Ball. Taken in Cork harbour; Cork Fauna. A specimen obtained at Bundoran by Mr. Warren; Ardmore, Mrs. Mackesy. Individuals extremely few in number,—from 30 fathoms (sand), between Cape Clear and Baltimore Harbour, Mr. M'Andrew.

E. distorta, Des.

M. Malbay, Prof. Harvey. Bundoran, Mrs. Hancock. Portmarnock, Mr. Warren. Dredged from 15 fathoms, Birterbuy Bay, Dr. Farran, who has likewise obtained it in Bantry Bay. In the former of these two localities both this species and *E. polita* were procured by Mr. Barlee. Ardmore, Co. Waterford, Mrs. Mackesy. It will probably be met with on the northern coast. In shell-sand, dredged in Lamlash Bay (S. W. Scotland), by Major Martin and the Rev. D. Landsborough, and favoured me by those gentlemen, a number of specimens were found. It is worthy of note, that the material in which they were, contained a great quantity of *Nullipora*, and hence would be termed by some persons coral-sand; it was extremely rich in species of minute *Mollusca* and in *Foraminifera*. Shell-sand, deep water, Belfast Bay, 1850, Mr. Hyndman.

Genus STYLIFER.

S. Turtoni, Brod.

Mr. Jeffreys informs me that his collection contains a specimen of this shell from Dublin Bay.

Genus CHEMNITZIA.

C. Jeffreysii, W. T., Ann. N. H., vol. v. p. 12.

Dublin coast, Dr. R. Ball, Mr. Warren: very rare.

C. fulvocincta, Thomp., W. T., Ann. N. H., vol. v. p. 98.

In shell-sand, collected at Portmarnock by Mr. Warren and Miss Ball: rare.

C. indistincta, Mont., W. T., vol. xiii. 432.

Portmarnock, Mr. Hyndman, 1835; Mr. Warren. Bundoran, Mrs. Hancock. Very rare.

C. elegantissima, Turt.

Not uncommon; dredged in harbour at Bantry (3—4 fathoms). Mr. M'Andrew.

C. decussata, Mont.

Given on the authority of Turton only, who notes it as found in Dublin Bay. See his Conch. Dict., p. 210, *Turbo arenarius*.

C. unica, Mont.

Noticed by Turton as from Dublin Bay, very rare. Specimens from Portmarnock (Mr. Warren) and Clontarf (Miss M. Ball) have come under my inspection; on examining six of these from the former locality, each was found to have nine volutions, the number attributed to the species in Montagu's description, though his figure represents about 13. Bundoran, Mrs. Hancock. M. Malbay, Prof. Harvey. Dredged in harbour at Bantry (3—4 fathoms), Mr. M'Andrew. Mr. Barlee in a letter to me mentions that he has procured this species commonly at several localities in the South of England, and *C. nitidissima* always with it, but in every locality very much scarcer. Deep water, Belfast Bay, 1850, Mr. Hyndman.

C. nitidissima, Mont.

Dublin coast, Brown, Turton. Specimens from Portmarnock, Bundoran, and Roundstone have come under my inspection; from the last a specimen procured by Mr. Barlee was kindly sent to me. Prof. Harvey has obtained it very rarely in sand at Miltown Malbay.

C. ascaris, Turt.

New and very elegant species from Seafield on the Atlantic; very rare. Turton's Catalogue, Irish shells. See his Conch. Dict., p. 217. From Portmarnock, in Mr. Warren's collection.

C. glabra, Leach.

Mr. Alder remarks—"A specimen I have from Portmarnock is the same as is marked *Alvania glabra*, Leach, in the British Museum, but it may be a worn variety of *Turritella ascaris*." It has been collected at the locality already named by Mr. Warren, and at Bundoran by Mrs. Hancock.

Genus TURRITELLA.

T. terebra, Brown.

In the Loughs of Belfast and Strangford this common species is dredged alive, from all depths, but chiefly from about 4 to 10 fathoms on sand or ooze; in Carlingford Bay it has been observed living between tide-marks, by Mr. Hyndman. This gentleman, accompanied by Dr. Ball and Professor Edw. Forbes, when dredging Clew Bay, in July, 1840, were much attracted when passing over great submarine tracts of *Chorda Filum* (every plant of which was many yards in length) with the beautiful and singular appearance presented by innumerable quantities of these *Turritellæ* attached to this filiform alga, and maintaining their hold, no matter to what degree it was waved about by the currents.

Genus BROCHUS.

B. striatus, Brown.

Among shell-sand brought from Bantry Bay, in 1834, W. T. Clarke, Mr. Jeffreys.

B. lævis, Brown.

Cork and Bantry, Mr. Jeffreys. Shell-sand, deep water, Belfast Bay, Mr. Hyndman, 1850.

Genus TRUNCATELLA.

T. Montagui, Lowe.

W. T., Ann. Nat. Hist., vol. vii. p. 480. A specimen agreeing with Montagu's description of *Turbo subtruncata* (p. 300), but not very well with his figure (t. 10, f. 1), was found among shell-sand collected at Bundoran by Mrs. Hancock.

Genus PALUDINA.

P. vivipara.

In his Irish Testacea, p. 527, Capt. Brown notices this species under the last-quoted name as found "in a stream near Newtownards, County of Down; rare": by a letter from this author I learn that he himself procured the shell in that locality. Mr. Gray (Man. p. 34) incidentally notices *Paludina achatina* as an Irish species, but on inquiry from him he could not recollect from whom he had received the information. I have not seen undoubtedly native specimens, either of *P. vivipara* or *P. achatina.*

P. tentaculata, Flem.

A common species throughout the island, generally approximating to Draparnaud's var. f. 20, pl. 1, more nearly than his normal shell, p. 19. I have on different occasions found the stomachs of gillaroo trout from Lough Neagh filled with this *Paludina.*

Genus LITTORINA.

L. communis, Turt. Br.

Abundant around the shores of the island.

The following note appears in my journal.—"Belfast Bay, Sep. 23, 1837. I observed a great many of the *Littorina communis* congregated and feeding upon a large frond of tangle (*Laminaria digitata*) which had been cast into a rock-pool, where the plant does not grow. From the number of these molluscs on this plant, it was evidently very much preferred to any of the spontaneous vegetation—and there were several species of *Algæ* in the pool.

L. rudis, Turt. Br.

This species or variety is common around the shores.

L. jugosa, Mont. t. 20, f. 2,

Considered by authors as a variety of this, is common on all quarters of the rocky coasts. On those of Ayrshire I have collected it.

L. petræa, Mont.,

Is much less common than the preceding *Littorina*, but found on every side of the island. Bundoran, Waterford coast. Portmarnock, Mr. Warren.

L. tenebrosa, Turt.

Although, like the last, met with on all sides of the coast, it is local. All the preceding species are chiefly found on rocks and stones, but this

species inhabits oozy tracts. The only locality worthy of special notice is a brackish lake in the largest of the South Islands of Arran, where an elongated variety was obtained by Dr. Ball and myself in the summer of 1834.

L. saxatilis, John. (W. T., Ann. N. H., vol. v. p. 12.)

Found sparingly in the localities indicated in the table.

L. Neritoides, Forbes.

Common around the shores.

Genus LACUNA.

L. puteola, Turt.

Kilkee (County Clare) may be added to the other habitats whence I obtained it in shell-sand; it is not uncommon on some parts of the western coast. Ardmore, Mrs. Mackesy.

L. pallidula, Turt.,

Inhabits the Laminarican region in Belfast and Strangford Loughs, and chiefly found on the broad fronds of *Laminaria digitata;* also on oysters: occurs but sparingly; procured in some quantity at Ballycastle by the Rev. Thomas Hincks. Frequent at Miltown Malbay, Prof. Harvey. Dredged in Clew Bay by our party in 1840.

Ardmore, Mrs. Mackesy.

L. crassior, Turt. Br.,

Inhabits the same region as *L. pallidula* in the two first-named localities, and generally found feeding on the tangle. Dublin Bay is noticed on the authority of Turton only. Dr. Farran includes it among the species procured at Birterbuy Bay; but it is not in Mr. Barlee's list from that locality.

L. quadrifasciata, Br. Turt.

A common species, inhabiting the same region and found on the same plant as the two last, but much more numerous: met with in shallower water. Dredged in Clifden and Clew Bays (3—12 fathoms) by our party in 1840; a green variety was found on *Zostera marina* in the latter locality. The var. *L. vincta* is not uncommon; *L. canalis* is more so.

Genus RISSOA.

R. cimex, Linn.

"Portmarnock, among loose stones and sand at high-water mark," Brown. I have seen specimens thence collected by Mr. Warren. Found very sparingly in shell-sand thence and from Bundoran. Ardmore, Mrs. Mackesy. I have obtained them more commonly at Brook, Isle of Wight.

R. striatula, Mont. (W. T., Ann. N. H., vol. v. p. 12.)

In shell-sand, Dublin; Bundoran; Malbay; Ardmore, Mrs. Mackesy.

R. costata, Turt.

This species, like the two last, is chiefly found in shell-sand, but is more numerous in individuals as well as being more widely distributed on our coasts.

Wherever they have occurred to me this also was found;—a remark which applies to the Isle of Wight as well as to the Irish shores.

Among coral-sand, at Bantry Bay, I procured it. It was dredged in Clew Bay by our party in 1840.

R. Harveyi, mihi.

This species, two lines in length, is most nearly allied to the *R. excavata*, Philippi (Enum. Moll. Sicil., p. 154, tab. 10, fig. 6). This shell was discovered at Miltown Malbay (County Clare) by Dr. W. H. Harvey, some years ago, and characteristically named by him *R. sculpta*; the term *insculpta*, being applied to a species of the allied genus *Odostomia*, has induced me, perhaps unnecessarily, to change the name. The species is dedicated to its discoverer, who had successfully studied our native Mollusca before his attention was directed to botany, in which department his labours have now long been known and appreciated. Bundoran, Mr. Warren. Two specimens of *R. Harveyi*, with one of which I was favoured, were procured at Bantry Bay by Mr. Barlee in 1845, and he has likewise obtained it from Burrow Island, Devonshire. The Rev. Mr. Landsborough has met with it in a sub-fossil state on the coast of Ayrshire.

R. abyssicola, Forbes.

Procured at the same depth and on the same ground as *Bulla acuminata* off Mizen Head.

R. parva, Turt.

A very common species around the coast; found living about the roots of sea-weed, &c.; abundant in shell-sand. At Brook, Isle of Wight, I have obtained a singular elongated variety.

R. costulata, Risso. Ann. N. H., vol. xv. p. 315 (1845).

When looking over the collection of Mr. Alder in October last, he pointed out a specimen of this shell, which had been given him by Dr. Farran of Dublin, who procured it at Roundstone, on the Galway coast. Mr. Barlee has favoured me with a specimen found by him in Birterbuy Bay. The specimens described in the Annals were from Torbay, Devonshire. I obtained this species at Brook, Isle of Wight, in 1841.

R. rufilabrum, Leach (sp.). Alder, in Ann. N. H., vol. xiii. p. 325.

Mr. Alder refers a *Rissoa* obtained at Portmarnock by Mr. Warren to this species. I obtained this species at Bangor, Belfast Bay, in 1835. It was sent me from Roundstone in 1840 by Mr. M'Calla, who obtained it attached to the roots of sea-weeds growing between tide-marks. It was dredged in Bantry Bay by Mr. M'Andrew. Ardmore, Mrs. Mackesy. Beach at Portmarnock, Mr. Warren.

R. reticulata, Turt.

R. punctura has so frequently passed under the name of *R. reticulata*, that I shall note only the one Irish locality whence specimens are in my cabinet, viz. Bantry Bay. In 1834 I obtained it there among coral-sand, and Mr. Barlee has subsequently supplied me with specimens from the same locality; also from Oban, west of Scotland. The Rev. D. Landsborough has added specimens from Arran, Frith of Clyde, to my collection. This shell has had the name of *R. Beanii* bestowed upon it of late years. Under that name and *R. calathisca* it has been sent to me from Scotland and England. Of the true *R. calathisca* I have not seen an Irish specimen.

R. punctura, Turt.

Owing to the confusion between this and the next species, the localities of Bundoran and Kilkee only, whence specimens are before me, shall be noted. From Burrow Island, Devonshire, it has been supplied me by Mr. Barlee.

R. inconspicua, Alder.

One specimen found at Portmarnock, 1838, W. T.; one at Bundoran, 1840, Mrs. Hancock.

R. semicostata, Mont.

Noticed by Turton as found at "Seafield, on the Atlantic," in Ireland, rare; and by Mr. O'Kelly, as obtained on the Dublin coast. I have not seen any shell agreeing with the description or figure of Montagu.

R. Bryerea, Mont.

Brown mentions his having seen one specimen from Portmarnock. Among shell-sand from Magilligan, one in Mr. Hyndman's collection was procured. Extremely rare.

R. striata, Dillwyn. (Desc. Catal. vol. ii. 859.)

Common around the coast. Found under stones in oozy, gravelly, and stony pools, between tide-marks. I have remarked them in Belfast Bay in summer clustered together, to the number of about a dozen, on the under surface of stones. Several of these clusters on one stone have a pretty appearance. Dredged from a depth of a few fathoms; occasionally found on oysters; among shell-sand also. This and *R. parva* seem to be the most generally distributed of the *Rissoæ* around the coast.

R. labiosa, Br. Turt.

In suitable localities around the coast, muddy banks being its favourite resort. On these, within and below low-water, it is common and fine in Belfast Bay. A very observant wild-fowl shooter, in sending me some specimens from a bank here to which the golden plover is partial, remarked that he always finds this species on the leaves of the "sleech-grass" (*Zostera marina*), on which he supposes it to feed, and never, like other *Rissoæ*, on *Fuci*. In the stomach of the grey mullet, and in that of various species of birds (*Grallatores* and *Natatores*) which feed on the oozy banks of Belfast Bay, I have found this shell, as well as *R. ulvæ*, but the latter was the more numerous. Bundoran, Warren.

R. ventricosa, Mont. Dublin Bay, Turton.

R. ulvæ, Br. Turt.

Common in suitable localities around the coast. Banks of soft sand and ooze between and beyond tide-marks often, as in Belfast Bay and Strangford Lough, &c., produce it in vast profusion. It is the chief food of the grey mullet here in spring, when it roves feeding along these banks, and of various birds at all times of the year.

R. fulgida, Mont. (sp.)

Taken about the roots of sea-weed at low-water, Birterbuy Bay, by Mr. Barlee.

R. rubra, Adams.

Dublin coast, Turton; M. Malbay (Prof. W. H. Harvey); sent me from Roundstone by Mr. M'Calla, in 1840, as found there, but as rare, about the roots of *Algæ* growing on the exposed shores. In shell-sand from Kilkee. Among sea-weed brought from Tory Island (off the North coast of Donegal) by Mr. Hyndman in 1845, this species, together with *R. parva* and *R. interrupta*, was found.

R. interrupta, Br. Turt.

One of the more common species around the coast, frequenting chiefly soft sand and ooze; littoral and at a few fathoms.

R. proxima, Alder.

This is the *R. vitrea* of my report on the Fauna of Ireland; it was considered at that time by Mr. Alder to be so.

M. Malbay, Prof. Harvey; Magilligan (W. T.); Portmarnock (W. T.); Bundoran (Mrs. Hancock); Bantry Bay.

R. nivosa, Mont. Dublin Bay, Turt.

R. unifasciata, Mont. As last.

R. cingilla, Br. Turt.,

I have met with attached to stones in gravelly and muddy pools, between tide-marks, on all sides of the coast. Mr. M'Calla, in sending me specimens from Roundstone, stated that he found it there among *Kellia rubra* on the exposed rocks, inhabited by *Mytilus incurvatus*, as well as under stones on muddy banks. Ardmore, Mrs. Mackesy.

Var. *rupestris*, Forbes.

Dublin coast, T. W. Warren, Esq.; North-East coast, Mr. Hyndman and W. T.: not rare.

R. alba, Adams. (W. T., Ann. N. H., vol. v. p. 12.)

Youghal, Miss M. Ball.

R. Ballicæ, mihi.

Elongated; white; apex obtuse; 5 slightly-rounded whorls, deeply marked longitudinally with somewhat distant striæ; aperture ovate; margin of the mouth thin; lower portion of the first whorl spirally striated; length 1½ line.

Although of a more slender form, this species, in sculpture, &c., somewhat resembles *Odostomia spiralis*, but is a true *Rissoa*.

Found at Youghal by Miss M. Ball, after whom it is named, though a very trivial compliment to that lady's acquirements in different departments of the Invertebrata of Ireland.

R. semistriata, Mont.

In the Annals of Natural History, vol. v. p. 98 (1840), the following description was published:—

"*Rissoa tristriata*, mihi.

"Conic; volutions 5½; rounded, smooth, with spiral rows of tawny spots; first whorl very large; aperture roundish oval; umbilicus none;

3 striæ winding round the summit of each whorl. Length 1¼ line. A connecting link between *R. semistriata* and *R. interrupta*. Found at Youghal by Miss M. Ball."

The shell so described is generally believed not to differ from *R. semistriata*, but Prof. Magillivray is inclined to regard it as distinct (*Moll. Aberdeen*, p. 350). *R. semistriata* has come under my inspection in shell-sand from Magilligan, Bundoran, and Kilkee.

R. dispar, Mont., Portmarnock, Turt. C. D.,

"Has been met with on the rocks near the Giant's Causeway."—*Brown's Illust.*, p. 16, 2nd edit. Noticed with doubt as from Bantry Bay in the Fauna of Cork.

R. Warrenii, Thompson. (Ann. N. Hist., vol. xv.)

On my submitting this species (which I could not find described) to Mr. Alder's opinion, he believed it to be new, and before returning the specimens wrote descriptions and made drawings for his own guidance.

"Shell slender; tapering, thin, transparent yellowish-white; with six much-rounded and deeply-divided whorls, terminating in a rather fine point; the nucleus sunk in the apex. Aperture oblong oval; outer lip thin, without rib; inner lip not reflected, but having a deep umbilicus behind it. The shell is slightly wrinkled by the lines of growth, and is delicately striated spirally: the striæ can only be seen with a good magnifier, and are most distinctly observable at the base. There are also some faint indications of small obsolete ribs on the middle whorls. Length 2-10ths of an inch; breadth 1-12th." Two specimens were found at Portmarnock (Dublin coast) by T. W. Warren, Esq. A specimen from Bundoran, Mrs. Hancock.

R. Beanii, Hanley.

Shell-sand, deep water, entrance of Belfast Bay.

R. albella, Alder.

Portmarnock, and between tide-marks, Dalkey Island, Dublin Bay, Mr. Alder. In shell-sand, collected at Bundoran, by Mrs. Hancock, in 1840. Kilkee.

R. decussata, Mont. Dublin Bay, Turt. C. D.

A specimen procured in Bantry Bay by Mr. Barlee, and one in Birterbuy Bay by Mr. Jeffreys, in 1845, have been kindly sent me.

Genus ODOSTOMIA.

O. pallida, Mont. Dublin Bay, Turt. C. D.

A very few individuals of this species have been dredged in Belfast Bay, and taken in the stomach of the grey mullet captured there; under stones between tide-marks. Strangford Lough, on soft sand and ooze.

O. unidentata, Mont. Dublin Bay, Turt. C. D.

More frequent in the shell-sand that has come under my inspection than any other *Odostomia*. Prof. Harvey notes it as not rare at M. Malbay. A specimen was dredged in soft sand at a depth of from 15 to 20 fathoms in Strangford Lough, by Mr. Hyndman and W.T. Mr. M'Calla

sent me specimens from Roundstone in 1840, stating that they were found on *Pecten maximus*, dredged from 18 fathoms, muddy bottom. The following species was found with them :—

O. plicata, Mont. Dublin Bay, Turton, C. D.

Although indicated from the four sides of the coast, I have seen but very few examples of this species. It has been found in Belfast Bay and Strangford Lough by Mr. Hyndman and myself; at Portmarnock, by Mr. Warren; at Bundoran, by Mrs. Hancock; and on the South-West coast, about Bantry Bay, by Mr. M'Andrew; Ardmore, Mrs. Mackesy.

O. spiralis, Mont. (W. T., Ann. N. H., xiii. 432.)

Very sparingly, in shell-sand collected at Magilligan, by Miss Moody; and at Portmarnock, by Mr. Warren.

The Bundoran habitat is not altogether certain.

O. interstincta, Mont. (W. T. as last.)

Portmarnock as last, included together with *O. pallida* in Mr. Barlee's list of shells obtained at Birterbuy Bay.

O. cylindrica, Alder. (W. T., Report, &c., and Ann. N. H., xiii. 432.)

One specimen was obtained from shell-sand collected at Bundoran by Mrs. Hancock.

O. obliqua, Alder.

Two specimens obtained with the last.

O. crassa, Thompson.

Of this shell a single specimen was sent me from Roundstone, Galway coast, in Oct., 1840, by Mr. M'Calla. Mr. Alder describes it: "Shell thick, conical, opaque, of a dull dirtyish white, with five flat whorls, the last occupying about two-thirds of the shell. The apex is slightly oblique, the upper whorls smooth, the last rugose, bulging, and rather flattened in the middle, having strong coarse striæ crossed by indistinct lines of growth. Aperture ovate, white and polished internally; outer lip thick, acute at the edge; inner lip reflected on the pillar with a deep impression behind it; but no umbilicus. Tooth strong. Length 1½ tenth of an inch; breadth nearly 1 tenth."

In a paper by Loven, on the genus *Turbonilla*, Leach, published in 1846, he adopts *Odost. crassa*. Thompson describes and figures it, and gives as "hab. in Pectine, maximo, Bahusie."

Genus SKENEA.

S. depressa, Mont. Bantry Bay, Turt. C. D.

I have taken this species in abundance on the fresh leaves of *Zostera marina*, at Strangford Lough, and on the same plant and *algæ* it is common in Belfast Bay. In the stomachs of grey mullet, which fish feeds on the very minute Mollusca of the ooze banks here, this species has been met with in quantities, as noticed in the Ann. N. Hist., vol. ii. 354. Bundoran, Mr. Warren.

S. Serpuloides, Mont. Dublin Bay, Turt. C. D.

Genus VALVATA.

V. piscinalis, Lam.

Common, and generally distributed over Ireland. Many of my middle-sized specimens correspond with Pfeiffer's *V. depressa*, in so far as the figure and diagnostic description enable me to judge, Pfeiff. part i. p. 100, t. 4, f. 33. See Gray, Man., p. 98. This species is very variable in the degree of elevation of its spire, and consequently in its diameter relatively to its height. I have been favoured by Edward Waller, Esq., with specimens of this *Valvata* collected at Finnoe, County Tipperary, the volutions of which appear angular, from being spirally cut, as they occasionally are in various species of *Limneus*, and the angles are marked with a white line.

V. cristata, Mull.

This handsomely-formed species is distributed over the island.

The *Valv. Planorbis*, Drap., noticed as Irish in Lond. and Edin. Phil. Mag., 1834, p. 300, must be erased from the list.

Family TROCHIDÆ.

Genus NERITINA.

N. fluviatilis, Lam.,

Is found in the East, West, and South of Ireland. The localities given by Capt. Brown are,—"In a stream at Clonooney, in the Shannon, and Bresha; and in some places of the canal, adhering to stones," p. 532. In the vicinity of Dublin it occurs in the Grand Canal; at Lough Derg, and Limerick, it is found in the Shannon; and in the County of Tipperary, in some of the tributaries of this river; and about Cork, in the river Lee. The specimens which I possess from the Shannon and Grand Canal are identical with the *N. fluviatilis*, represented by Rossmassler, and as distinguished from the *N. Danubialis*, *N. strangulata*, and *N. transversalis*. Icon. part 2, p. 17, 18, pl. 7.

Genus PHASIANELLA.

P. pulla, Brown.

Littoral in some localities, dredged in from about 6 to 10 fathoms in Belfast Bay, common.

Genus TROCHUS.

T. Magus, Turt.

This common species, though not numerous in individuals, in so far as it has come under my notice, is doubtless found at all the localities set forth. It is not included in all the lists put before me. On the western coast I have met with it at the South Islands of Arran; Killery, Clifden, and Clew Bays. In our North-eastern Bays it is occasionally found alive between tide-marks, but its general haunt is where the water is several fathoms, 8 to 10, &c., in depth.

T. umbilicatus, Turt.

Common, and in numbers on gravelly shores.

T. cinerarius, Turt.

Still more widely diffused, and in greater numbers than the l… Found at the depth of a few fathoms, as well as living between ti… marks.

T. littoralis, Brown.

Killough, County Down, and Clew Bay, County Mayo, are the locali… in which this species is said to be found.

T. tumidus, Turt.

Dredged in very limited numbers from the deeper portions, 10 to 12 fathoms, &c., in Belfast and Strangford Loughs, and at Donaghadee. Like most of our Mollusca, &c., it attains a much larger size on the Dublin coast than in the localities just named. In Clifden and Clew Bays, on the western coasts, it was dredged by our party in 1840.

T. papillosus, Br.

Dublin Bay; Bray, County Wicklow. Single specimens of this fine species have been obtained on the South-West coast of Scotland, from 50 fathoms off the Mull of Galloway (Capt. Beechy, R. N.), and from 40 off Sana Island (Mr. Hyndman).

T. ziziphinus, Br.

Of common occurrence, but not numerous, on our northern coast, from just below low-water mark to 12 fathoms, &c.; inhabits chiefly the Laminarian region, and is found on the fronds of *Laminaria*. This *Trochus* is subject to considerable variety; the *T. discrepans*, Brown, Irish Testacea, p. 519, pl. 24, f. 4, is noticed as such by Turton in his Conch. Dict., p. 189. A single specimen only is recorded to have been found at Holywood, Belfast Bay, by Miss Templeton. The pure white variety has been dredged of all sizes, but very sparingly, in this lough, by Mr. Hyndman and myself; on one occasion we found numbers of this variety on the beach at Ardmillan, whence they were brought adherent to "wrack" (fuci) cut for manure about some of the islands.

T. millegranus, Philippi.

This species has been in my collection for some years from the northern and southern localities of Strangford Lough and Bantry Bay. Prof. Forbes informs me that it is to this *Trochus* the name of *T. Martini* is applied in Mr. Smith's paper, lately published in the Wernerian Memoirs (vol. viii. part 1). It is there stated that Mr. Alder found the species at Dublin, but I understand that the Irish specimens thus alluded to were not from that locality, but from the one first mentioned here. Mr. Humphreys of Cork, from whom I had the Bantry Bay specimen in 1835, stated that Dr. Turton had named it *T. conuloides*. *T. Clelandi*, Wood, Index, Test. Supp., f. 15, is considered another var. It was sent to the Author from Strangford Lough, by James Rose Clealand, Esq., Dalkey Sound, Dublin Bay, Dr. Ball; Glandore, County Cork, Prof. Allman; and Killery Bay, County Mayo, and Galway, W. T. &c., may be named as localities in which this *Trochus* has been dredged. In the last it was taken within 3 to 12 fathoms. It inhabits the deeper portions of Strangford and Belfast Loughs, chiefly from 10 to 23 fathoms, in sand ooze, &c.; living specimens were dredged from 50 fathoms off the Mull of Galloway, see Ann. N. H. vol. x. 21. Bundoran, Mrs. Hancock.

T. Montagui, Gray.

Portmarnock, Mr. Warren. In or near Bantry Bay, Mr. M'Andrew.

T. striatus, Mont.

Professor Allman dredged about a dozen in one haul, from about 6 fathoms, in Baltimore Harbour. Cork and Bantry, Mr. Humphreys.

T. exiguus, Pult.

I have seen two specimens in Mr. Warren's collection, they were given to him as from Wicklow coast, but he is not certain of the truth of the statement.

Genus MONODONTA.

M. crassa, Brown.

This littoral species, found on rocks, stones, &c., is unknown to me further North on the eastern line of coast than Ballywalter, County Down (54½° lat.). Southward it is common, but does not appear to be universally distributed. At the South Islands of Arran and Roundstone I have procured it in abundance; in 1847, Mr. Warren gave me specimens from Bundoran.

Genus MARGARITA.

M. communis, Mont.

Turton notices this species in his catalogue, merely as from drifted sand. Portmarnock, Mr. Warren has it thence. It inhabits the Laminarian region of the Loughs of Larne, Belfast, and Strangford, being found on the broad living fronds of the *Laminaria digitata*, &c., brought up by the dredge.

Genus ADEORBIS.

A. subcarinatus, Turt.

Noticed under the name of *Trochus rugosus* by Brown (Wern. Mem. vol. ii. p. 520, pl. 24, f. 5), as "found in drifted sand at Portmarnock, by Dr. Turton, who says it is not uncommon." Found in fine shell-sand. In shell-sand, Belfast Bay, Mr. Hyndman.

Genus SCISSURELLA.

S. crispata, Flem.

Mouth of Belfast Bay, 27 fathoms, two dead specimens dredged by Mr. Hyndman.

Genus IANTHINA.

I. communis, Brown.

This interesting oceanic species is not uncommon at the more genial periods of the year, but chiefly in autumn; not unfrequently about the time of the equinox; borne in a living state on the waters of the ocean, to the shores of Ireland, from the Giant's Causeway, westward along the whole line of coast to Cape Clear. Beyond these limits it is more rare; only in one year (1836) am I aware of its occurrence so far southward, on the East coast, as the County of Down, from Bangor to Donaghadee; on the 11th of August, that year, a very few specimens (some containing the

animals, though dead) were found by Dr. J. L. Drummond and myself near Groomsport, and a fortnight afterwards one was obtained there. A specimen of this shell, kindly sent to me by Capt. Fayrer, R. N., of Portpatrick, early in the year 1837, was one of about a dozen collected some months before on the shore of Wigtonshire, by Lady Agnew of Lochnaw Castle. I noticed the occurrence of this species in 1836, as here mentioned, in Charlesworth's Mag. Those obtained in Scotland were probably a portion of the same fleet that had touched at different parts of the coast of Ireland. On the first of August that year, this *Ianthina* was abundant in the vicinity of the Giant's Causeway. Once only did Dr. R. Ball obtain even a single specimen at Youghal. At Dunmore, County Waterford, it is said by Turton to have been procured.

I. exigua, W. T.

In the proceedings of the Zoological Society of London for 1835, I noticed this species as obtained in considerable abundance in September, 1834, at Kilkee, on the coast of Clare, by Mrs. James Fisher of Limerick; which information was furnished, along with specimens of the shell, by my friend Professor Harvey. In the 2nd edition of his Illustrations, &c., p. 24, Captain Brown mentions this species as having been "found by R. J. Shuttleworth, Esq., at Connemara, West coast of Ireland"—no year is named. In 1836 Mr. M'Calla informed me that he had procured quantities in the last-named district in the autumn of 1835.

I. nitens, Menke.

This *Ianthina*, of which a number of specimens were found some years ago by my friend Professor Harvey (the well-known botanist), at Miltown Malbay, on the coast of Clare, is very distinct from the two known British species, *I. fragilis* and *I. exigua*, and was named *I. pallida* by Professor Harvey; whether it be really a nondescript species is difficult to be determined. The nearest approach I find to it is the *I. nitens* of Menke, as described and figured by Philippi in his excellent Enumeratio Molluscorum Siciliæ, but from this it differs in the columella being curved so as to present a somewhat rounded appearance, instead of being straight; the *Ianthinæ*, however, are subject to considerable variety. With the exception of this character, it agrees well in *form* with the *I. prolongata*, Blain., figured in Payraudeau's Moll. de Corse; but the colour of this (dark blue) is very different from mine. Philippi, at the same time, quotes the *I. prolongata* in Payraudeau as identical with his, which in colour, "*pallide violacea*," is similar to the Irish specimens, hence named *pallida*. This author again refers to what Blainville figures as one of the forms of *I. fragilis* (Malac. tab. 37, bis. fig. 1), for a representation of his *I. nitens*. Philippi's diagnosis of this species is "Testa ovata, obtusa, anfractibus omnibus valde rotundatis, sutura profunda divisis, apertura semiovata, labro profunde exciso angulo columellæ cum labro acuto."

Habitat, Sicily. Size of Irish specimens, 11 lines long, 8½ broad.

The genus *Ianthina* is in much confusion, which the present notes tend in no way to clear up; they are only intended to introduce a third species of this attractive genus to the British Fauna.

W. T. in Ann. N. H., vol. v. p. 96 (1840).

Genus SCALARIA.

S. clathrus, Turt.

Although not yet (so far as I am informed) taken in the Loughs of

Strangford or Belfast, it has been procured in the adjacent Lough of Larne.

Ardmore, Mrs. Mackesy. Bundoran, Mrs. Hancock.

S. clathratula, Turt.

As, in the table accompanying my report, this species appears to be as widely distributed as the last, it must be stated that it is generally a much scarcer species.

Ardmore, Mrs. Mackesy. Bundoran, Mrs. Hancock.

S. Turtoni, Turt.

Turton named this *Scalaria* after his daughter. He remarked, when describing it, "In many parts of Ireland, but especially about Balbriggan, they are found crawling among the rocks." Conch. Dict. p. 208. This locality is on the Dublin coast, where the species has also been obtained by Dr. R. Ball and Mr. Warren. It has been procured in a recent deposit of mud in Belfast Bay. At Newcastle, County Down, this recent shell has been met with by Dr. Drummond.

Specimens from Dundalk Bay are in Mr. Hyndman's collection. At Youghal it has been rarely found by Miss M. Ball.

S. Trevelyana (W. T. in Ann. N. H., vol. v. p. 245).

Specimens of this shell were kindly presented to me in 1835 by Mr. John D. Humphreys of Cork, as found on the coast of the County of that name. Mr. Hyndman possesses a specimen from Magilligan. When I noticed this species in the Annals, it had been merely named and not described by Dr. Leach from specimens found on the coast of Northumberland.

Family CERITHIADÆ.

Genus CERITHIUM.

C. Pennantii, mihi.

Of this shell there is a specimen from Youghal in Miss M. Ball's collection, agreeing with the descriptions of Fleming and Brown, but only tolerably represented in Pennant's British Zoology as *Turbo tuberculata*, and in Brown's Illustrations as *C. fuscatum*. Professor E. Forbes having informed me that the *Turbo tuberculata* of Linn. is a different shell, and that the *Cerithium* to which Costa applied the name of *C. fuscatum* is likewise distinct, I have considered it necessary to bestow a new name on the present species (Ann. N. H., vol. v. p. 12, 1840).

C. tuberculare (W. T., Ann. N. H., vol. v. p. 12).

First noticed as from M. Malbay, common, from being included in Professor Harvey's MS. Catalogue.

Dredged in Clifden Bay, West coast, between 4—10 fathoms (bottom *Nullipora* and sand), in July, 1840, by our party. From similar ground in Bantry Bay I have obtained it. Sandy beach at Magilligan; and in stomach of Scaup duck shot in Belfast Bay.—*W. T.*

Ardmore, Mrs. Mackesy.

C. reticulatum, Brown.

Common in shell-sand on the beach of Belfast Bay, and dredged alive and very fine from various depths, also sub-fossil; a considerable constituent in the formation of the Kinegar, Holywood. In quantity in the

heaps of *Nullipora* (" coral ") dredged for manure at Bantry Bay. T., 1834. Dredged in Clifden, Killery, and Roundstone Bays, 3— fathoms (bottom various), and living between tide-marks at Lahi (County Clare), by our party, 1840. Ballysodare (County Sligo), M Hancock. I have remarked it to be very common at Portpatrick in Sc land, and at Brock in the Isle of Wight.

C. reticulatum, var.

Whorls nine or ten, with three spiral ridges, the uppermost very prominent, and forming a keel round the suture; ridges crossed by somewhat distant longitudinal furrows.

Length 3½ lines, breadth 1½.

Colour purplish brown.

This shell differs from *C. reticulatum* in the prominent keel bounding the whorls on the upper side, and in the spiral furrows being much deeper than the longitudinal, and these less marked than in that species. As one individual only has been obtained, I named it doubtfully as new, *C. carinatum*; but according to the better judgment of Professor Harvey, it is only a variety of *C. reticulatum*; the shell was found by this gentleman at Miltown Malbay.

Montagu remarks that " a variety of *C. reticulatum* has one or two strong ribs crossing some of the volutions." Test. Brit. p. 272.

Ann. Nat. History, vol. v. p. 98.

C. costatum, Don.

Dillwyn, in his Descriptive Catalogue of Recent and Fossil Shells, notices this species as "plentiful in Bantry Bay," p. 679.

Turton considered that the remark could not apply to this species, which he was unable to find in that locality; an insufficient reason certainly.

But the fact is doubted by others, and I am unable positively to clear up the subject. In several collections I have seen specimens of this shell received from persons, some of whom stated that they had themselves found them in Bantry Bay, and others on the coast of Waterford, between Dunmore and Tramore, &c.

Genus TRIPHORIS.

T. adversus, Mont.

Turton noticed this as found at " Seafield (western coast), very rare." Professor Harvey considered it as common at Miltown Malbay; it has been obtained in shell-sand collected at Bundoran by Mrs. Hancock; and is included in the lists of species dredged in Birterbuy Bay by Dr. Farran and Mr. Barlee.

I have collected specimens at Brook, Isle of Wight.

Ardmore, Mrs. Mackesy.

In shell-sand, mouth of Belfast Bay, 1850, Mr. Hyndman.

Family BUCCINIDÆ.

Genus NASSA.

N. reticulata, Linn.

Generally distributed.

N. macula, Mont.

Generally distributed.

N. varicosa, Br.

A dead specimen was dredged (depth 12 to 15 fathoms) off the South entrance to Bantry Bay, in May, 1846, by Mr. M'Andrew.

Genus PURPURA.

P. lapillus, Linn. Common.

Genus MONOCEROS.

M. hepaticus, Mont.

North and East of Ireland, on the authority of Brown and Turton.

Genus BUCCINUM.

B. undatum, Linn. Common.

Var. β, Turton. East and South of Ireland.

B. Humphreysianum. Bennet.

Cork and Bantry, Mr. Humphreys.
Youghal, Dr. Ball.
West Coast, Mr. Barlee.

B. fusiforme, Brodie.

Cork, Mr. Humphreys.

B. ovum, Turton.

"Found in the intestines of a red gurnard brought to Cork market." Mr. John Humphreys.

B. Zetlandicum, Forbes.

A *Buccinum* taken on a long line in deep water near Bunowen, County Galway, was considered by Professor Forbes to be his *B. Zetlandicum*, though differing in its being a thin shell, &c. He does not now feel certain of this being more than a variety of *B. undatum*. The specimen is in the collection of Dr. Farran, who states that others were procured by similar means.

Genus FUSUS.

F. antiquus, Linn.

North, East, and South of Ireland.

F. corneus, Linn.

North, East, and South of Ireland.

F. muricatus, Mont.

North, East, and South of Ireland.

F. Barvicensis, Johnst.

A specimen is in the Collection of Irish Shells of the late John Templeton, Esq., presented by his family to the Belfast Museum. It was probably found in the North.

F. Bamffius, Flem.

On all parts of the Irish coast.

F. propinquus, Alder.

Bantry, Mr. Jeffreys.

Genus PLEUROTOMA.

P. Boothii, Smith (sp.). Wern. Mem. viii. part 1.

A specimen has been obtained at Portmarnock by Mr. Warren.

P. turricula, Mont.

Of general occurrence.

P. costata, Penn.

East, West, and South of Ireland.

P. septangularis, Mont.

Generally distributed.

P. attenuata, Mont.

General, but not abundant.

P. nebula, Mont.

North, East, and South of Ireland.

P. rufa, Mont.

Shell fusiform, turretted, with eight volutions; eleven ribs (on body whorl), with coarse deep spiral striæ.

Length 7 lines; breadth, just above aperture, 2¼ lines; volutions very slightly ventricose, rather flattened at top, but less so than in *P. turricula*; ribs strong and coarse, "not continuous from whorl to whorl;" coarse cut striæ across ribs and furrows; aperture crescentic; outer lip thin and in form of a bow; pillar-lip somewhat hollowed; canal very short.

Colour uniform dirty brown.

This species, coarse in form and sculpture and plain in colour, closely approximates *Pleur. brachystoma*, Philippi, Enum. Moll. Siciliæ, vol. ii. p. 169, pl. 26, f. 10; from which I could not regard it as distinct, but for a single character possessed by that species in *raised* spiral striæ. These are apparent in the profile of the shell as figured by Philippi; they are much more numerous too than the *deep* striæ of *Pleur. Ulidiana*.

Three specimens of this shell were dredged from a depth of about 8 to 10 fathoms by Mr. Hyndman and myself, in Oct., 1831, in Strangford Lough, County Down.

P. linearis, Mont.

Generally distributed.

P. purpurea, Mont.

Of general occurrence.

P. gracilis, Mont.

Portmarnock and Bray, rare.

P. sinuosa, Mont.

On the East coast, according to Turton.

P. Trevellyana, Turt. As the last.

P. Farrani, Thompson.

Of this shell, handsome both in form and colour, two specimens were obtained by Dr. Farran on the Irish coast, he thinks at Portmarnock. Galway, Mr. Barlee.

P. brachystoma, Philippi.

This species was found in Bantry Bay in the summer of 1844 and 1845 by Mr. Barlee.

P. Ulideana, Thompson.

Round the Irish coasts, but rare.

P. lævigata, Philippi.

Mr. Alder writes to me as follows, in Oct., 1846 :—"I have two specimens of what I take to be *Pleur. lævigata*, Phil., from Dr. Farran, who got them in Connemara. This shell I have had undetermined in my cabinet for some time, as Mr. Clark gave me worn specimens several years ago.

P. teres, Forb.

One dead specimen was dredged from about 14 fathoms in Birterbuy Bay, County of Galway, in the summer of 1845, by Mr. Barlee.

Genus TRICHOTROPIS.

T. borealis, Brod. and Sow.

A specimen was found among a quantity of old and worn bivalve shells, dredged from 25 to 35 fathoms, outside the entrance of Belfast Bay, in July, 1848, and sent to me by Mr. Hyndman. Mr. Barlee obtained the species in the summer of this year on the coast of Galway.

Genus TRITON.

T. erinaceus, Penn.

Of general occurrence.

T. elegans, Thompson.

Shell turreted, somewhat ventricose, about 8 volutions, numerous prominent ribs, crossed by fine raised spiral striæ.

Colour greenish white, with two double spiral lines of yellow, one series above the top of aperture, the other rather below it.

This species is more handsomely formed, sculptured, and coloured than *Triton erinaceus;* its canal is much shorter.

I have seen only a single specimen, which was found alive at Portmarnock, on the Dublin coast, by Dr. Farran.

Genus APORRHAIS.

A. pes-pelecani, Linn.

Of general occurrence.

Family INVOLUTÆ.

Genus CYPRÆA.

C. Europæa, Mont.

Generally distributed.

Genus OVULA.

O. patula, Penn. (sp.).

A shell of this species, found some years ago on the sandy beach of Magilligan, County of Londonderry, by Mrs. R. A. Hyndman, of Dublin, is in the cabinet of Mr. Hyndman, at Belfast.
Birterbuy Bay and Arran, Mr. Barlee.

O. acuminata, Brug.

At Arran, off Galway Bay, by Mr. Barlee. About the same time (May, 1848) Mr. M'Andrew's dredge brought up a dead specimen between Penzance and the Old Head of Kinsale. He also took the species in 60 fathoms water, on sandy mud, about 15 miles off Mizen Head (the nearest land), and in Bantry Bay.

Genus ERATO.

E. lævis, Don.

M. Malbay, rare, Prof. W. H. Harvey; Magilligan (Co. Londonderry), G. C. Hyndman; South Islands of Arran, Dr. R. Ball.

Genus TORNATELLA.

T. fasciata, Lam.

Generally distributed.

Family SIGARETIDÆ.

Genus SIGARETUS.

S. perspicuus, Linn.

Generally distributed.

S. tentaculatus, Flem.

In January, 1835, two small individuals, about 4 lines in length, of this rare species, were dredged in Strangford Lough by Mr. Hyndman and myself.
Arran, Mr. Barlee.

Genus VELUTINA.

V. lævigata, Linn.

Generally distributed.

V. otis, Turt.

Procured at Miltown Malbay by Professor Harvey; and in Clifden Bay, County Galway, a dead specimen was obtained by dredging, in July, 1840. R. Ball, E. Forbes, W. T.

Family NATICIDÆ.

Genus NATICA.

N. monilifera, Lam.

Of general occurrence.

N. nitida, Don.

Generally distributed.

N. sordida, Phil.

From Dublin Bay, in Mr. Jeffrey's cabinet. Dredged off Dingle Bay and Baltimore Harbour by Mr. M'Andrew.

N. Montagui, Forb.

Three or four specimens were obtained from a depth of 45 fathoms off Cape Clear by Mr. M'Andrew, who remarks, "I have besides met with it only on the West coast of Scotland and at Zetland; it is there a common shell, in from 12 to 15 and up to 50 fathoms, on a rather hard bottom."

A living *N. Montagui* was dredged in Belfast Bay at the same time with the next.

N. Alderi, Forbes.

Shell-sand, deep water, Belfast Bay, Mr. Hyndman.

ORDER SCUTIBRANCHIATA.

Genus HALIOTIS.

H. tuberculata, Linn.

"Dredged near Groomsport, Co. Down, Oct. 1811," Templeton, MSS.

Genus CALYPTRÆA.

C. sinensis, Linn.

On the East coast.

Genus CAPULUS.

C. Ungaricus, Linn.

Generally distributed.

Genus FISSURELLA.

F. græca, Flem.

On all the Irish coasts.

Genus PUNCTURELLA.

P. noachina, Linn.

Mouth of Belfast Bay, in 27 fathoms, one dead specimen dredged by Mr. Hyndman.

Genus EMARGINULA.

E. fissura, Linn.

Generally distributed.

E. crassa, Sowerby.

A few specimens taken at the Kish Bank in 1845 by fishermen were found in their boats, on their return thence to the Dublin coast, by Mr. Doran (collector of objects of natural history), of whom they were purchased by Mr. Hyndman. This gentleman and Mr. Edm. Getty, when dredging at the entrance of Belfast Bay on the 3rd Oct., 1846, obtained from a depth of twenty fathoms five dead shells of this species; these were from 9 to 14 lines in length; the specimen of this latter size was 10 lines in breadth and 8 in height. A few living and dead specimens of *Emarg. fissura* were dredged with the *E. crassa* on this occasion.

Genus LOTTIA.

L. virginea, Muller.

In Mr. Hyndman's collection (Belfast) are a few specimens of this shell —the first obtained on the shore of Belfast Bay by Mrs. M'Gee, the others found by Mr. H. adhering to oysters in Belfast market in 1831.

L. testudinalis, Muller.

Northern and eastern coasts.

Newcastle, Down, Sep. 1, 1836. Looked particularly for this shell on stones opposite the village, at low-water, and found only two or three dead ones.

Bloody Bridge, Oct. 22, 1851. I found two very fine living specimens here at extreme low-water. I presume there are plenty, but I had a very short time to look for them.

At Glassdrummond, two miles southward of the Bloody Bridge, Patrick Doran tells me it is common at low-water mark, and very fine.

L. fulva, Muller.

One of this species was found by Miss M. Ball several years ago in company with *Crania personata*, Lam., on a stone dredged in very deep water at Youghal.

ORDER CIRRHOBRANCHIATA.

Genus DENTALIUM.

D. dentalis, Turt.

Eastern and western shores of Ireland.

D. entalis, Linn.

On most parts of the Irish coast.

ORDER CYCLOBRANCHIATA.

Genus PATELLA.

P. vulgata, Linn.

Common everywhere.

P. pellucida, Linn.

Of general occurrence.

P. ancyloides, Forbes.

Obtained by Mr. Hyndman many years ago on oysters from Strangford Lough. Length 3 lines, breadth $2\frac{3}{4}$, height $1\frac{3}{4}$. The great resemblance this shell bears to the *Ancylus fluviatilis* is not confined to external appearance, but internally it exhibits the same bluish cast.

Genus CHITON.

C. fascicularis, Linn.

Generally distributed.

C. marginatus, Penn.

On all parts of the Irish coast.

C. ruber, Linn.

Among oysters from Killinchy, Down. Temp. MSS. Found by Mr. Hyndman and myself in different localities on the North-East coast.

C. albus, Mont. As last.

C. fuscatus, Brown. As last.

Newcastle, Co. Down, Oct., 1851. I found a large perfect one in the stomach of a haddock; the first *Chiton* I remember to have taken from the stomach of a fish.

C. cinereus, Linn.

On most parts of the Irish coast.

C. lævis, Mont.

On both sides of Ireland, but rare.

C. albus, Linn.

North coast of Ireland.

C. lævigatus, Flem.

Obtained in Strangford Lough by Mr. Hyndman and myself. On oysters brought to Belfast market from Carlingford and Greencastle (Co. Londonderry), W. T.; Bangor, Co. Down, Mr. R. Patterson.

C. Hanleyi, Bean.

Dredged off Arran islands, Co. Galway, by Mr. Barlee, in 1848; Mr. Jeffreys.

CLASS BRACHIOPODA.

Genus TEREBRATULA.

T. aurita, Flem.

The Museum of Irish Industry, 51, Stephen's Green, Dublin, contains a specimen labelled as obtained at Whitehead Bay, County Antrim, November, 1839. It was, I believe, taken alive by dredging.

Alive in deep water, off the Copeland Islands, 1850, Mr. Hyndman.

T. psittacea, Turt. (sp.), Conch. Dict. p. 5.

A specimen of this *Terebratula*, labelled "Dublin Bay," was observed by Mr. Alder and myself in the Museum of the Royal Dublin Society.

Turton mentions a single specimen of "*Anomia terebratula*" being "dredged up alive in Dublin Bay, and placed in the Museum of the Dublin Society;" but we could not ascertain whether the shell now preserved was that alluded to by Turton.

Anomia psittacea was noticed by him only as an English species.

Genus CRANIA.

C. personata, Sow.

From deep water, off Youghal, Dr. Ball.
On *Pinna ingens*, dredged at Cork and Kinsale, Mr. Humphreys.
In shell-sand, mouth of Belfast Bay, 1850, Mr. Hyndman.

CLASS LAMELLIBRANCHIATA.

DIVISION MONOMYARIA.

Family OSTREADÆ.

Genus ANOMIA.

A. ephippium, Linn.

"West of Ireland, Dublin Bay," Turton; on oysters from coasts of Antrim and Down, W. T; Bantry Bay, Mr. J. D. Humphreys; Dublin Bay, two specimens, and in great plenty on oysters from Carlingford and Lough Strangford, Brown. It is common and often gregarious on oysters from the northern and eastern coasts generally. Dublin; Youghal, Dr. R. Ball; Cork Harbour, Mr. Humphreys; dredged in Clew Bay by our party in 1840.

A. squamula, Br. Turt.

"Not uncommon, adhering to Carlingford oysters," Brown. Dublin Bay, Turt. Catal. Common on the coasts of Londonderry, Antrim, and Down, about the roots of tangle (*Laminaria digitata*), &c. Youghal, Dr. R. Ball; Cork Harbour, Mr. Humphreys, who remarks in the Fauna of Cork, "frequent on oysters, lobsters, and other marine bodies." Dredged in Clew, Clifden, and Killery Bays (3—12 fathoms, bottom various) by our party in 1840.

A. undulata, Mont.

Strangford Lough, Brown. Dublin Bay, Turt. Catal. Specimen thence in Dr. R. Ball's collection, considered *A. und.* by E. F., 1847, a scarce form or species. Such specimens as have come under my notice in a living state, were in sheltered sites; one, and a very large individual, adherent to the inside of a quart bottle found in the stomach of a cod-fish! Carlingford, Mr. Hyndman. Youghal, Miss M. Ball. Adhering to *Pinna* taken in Cork Harbour, Mr. Humphreys.

A. punctata, Turt. (W. T., Ann. N. H., vol. v. p. 13.)

Youghal, Dr. R. Ball.

A. cylindrica, Turt.

Dublin Bay, Turt. Catal. Occasionally found about the roots of *Laminaria digitata* on the North and North-East coast, Mr. Hyndman, W. T. Youghal, Dr. R. Ball.

A. aculeata, Mont.

"In sand from Portmarnock, not uncommon," Brown. Dublin Bay, Turt. Catal. Not uncommon on the North and North-East coasts, chiefly about the roots of *Laminaria digitata*. Youghal, Dr. R. Ball.

Adhering to *Pinnæ* taken in Cork Harbour, Mr. Humphreys.

In shell-sand from Kilkee, Co. Clare, W. T. Birterbuy Bay, Mr. Barlee.

Genus OSTREA.

O. edulis, Br. Turt.

Gregarious in suitable localities around the coast, differing much in size and quality, as an article of human food, on different beds.

March 1, 1848.—Carrickfergus Oysters.—The four largest picked from about 500 were brought me to-day. I weighed them before being opened, and found one 2 lbs., another 1¾ lb. (imperial weight), and the two others about 1½ lb. each. I weighed the oysters themselves, after being extracted, and found the two largest about 1½ oz. each, the others somewhat less. The oysters from which these were picked are now sold at 16s. for 124. My specimens were dredged from 25 fathoms.

March 15, 1848.—The following dredged from about 25 fathoms :—

Length of shell	5½ to 6½ inches.
Breadth	5 — 5½ —
Depth	valves closed 2½ —

March 15, 1848.—Five Carrickfergus oysters brought to me weighed from 1 lb. 13½ oz. to 2 lbs. 1 oz.

Family PECTENIDÆ.

Genus PECTEN.

P. maximus, Br. Turt.

"Portmarnock, rare; more plentiful at Bray; and common in L. Strangford." Brown. Along the Antrim and Down coasts, where it is commonly called *Clam*, and used as human food, though not so generally esteemed as the scallop (*P. opercularis*), W. T. Dredged in Clew and Killery Bays.

1834.—Clam-shell filled with oil, in which a lighted wick was placed, was the only light given us in the inn at Arran. It was placed on the hob of the fire-place.*

P. opercularis, Turt.

The scallop is the most common species both as to distribution round the coast and numbers; gregarious; brought chiefly from Strangford Lough to Belfast market as an article of food. The animals are boiled and taken from the shells before being brought to market, where they are sold by measure. Dredged from about 10 to 12 fathoms, coralline region; in Belfast and Strangford Loughs. On the Dublin and Wicklow coasts the shells are most vividly and beautifully coloured. Dredged in Clew and Killery Bays. Var. *lineatus* I have dredged in Belfast Bay, as Mr. Warren likewise has off the Wicklow coast. He has likewise obtained a few on the beach at Portmarnock.

P. sinuosus, Turt.

Commonly met with among oysters and dead bivalve shells; it is occa-

* *Pecten Jacobæus* is noticed by Turton, Conch. Dict., as found in Dublin Bay; but in his British Bivalves it is spoken of doubtfully as a British species. It is given as a North of Ireland species in Smith's Catalogue of Recent Shells published in Wern. Mem., vol. viii. part 1. But positive information respecting it is required before it be included in our Fauna, in which I do not anticipate that it will ever properly hold a place.

sionally found adapted to the form of the shell to which it attaches itself. Belfast and Strangford Loughs, Mr. Hyndman; Carlingford, W. T.

P. glaber, Mont.

Cork Harbour, rare, Mr. Humphreys; Birterbuy Bay, Dr. Farran. I have not seen the specimens from either locality.

P. lævis, Penn.

Noticed as from "Dublin Bay, very rare," in Turton's Catalogue; but in his Conch. Dict. (p. 131 and 133), and Brit. Bival. (p. 213, 214), he makes *P. lævis*, Mont., the same as *P. similis*, Laskey. Mr. Barlee includes *P. lævis* in his Birterbuy Bay list.

P. similis, Laskey.

Numerous valves were dredged from 45 fathoms off Cape Clear by Mr. M'Andrew, who finds it "an abundant deep-water species from Scilly to Zetland." Entrance of Belfast Bay, 30—35 fathoms, Mr. Hyndman. This species was noted, at the suggestion of Professor Edward Forbes, as probably synonymous with *P. lævis*, in my Report on the Invertebrata of Ireland.

P. obsoletus, Penn.

Taken not uncommonly, but in limited numbers, in the deeper parts of Belfast and Strangford Loughs, on shelly and sandy ground. A specimen dredged at Roundstone by Mr. Jeffreys, given me by that gentleman.

Mr. Humphreys mentions *P. lævis*, Penn. Mont., as often found in the intestines of haddock and gurnard taken in Cork Harbour; he favoured me with one of these specimens, which I regard as a smooth variety of *P. obsoletus*.

P. varius, Linn.

Not very uncommonly found attached by a byssus to the shells of oysters, brought from the North and East coasts, &c., to Belfast market. Dredged in Killery, Clifden, and Clew Bays in July, 1840. Dr. Farran mentions his finding *P. varius* and *P. maximus* at 20 fathoms in Roundstone Bay, and in some situations with not more than a foot of water over them in Clifden Bay, and in some instances the *P. varius* was altogether dry, 1844. Mr. Warren has a specimen 3½ inches long and the same broad, found at Killibegs.

P. striatus, Muller.

A single specimen dredged in Strangford Lough in 1837 by Mr. Hyndman and myself.

Procured on rocky ground, East of Cape Clear (40 to 45 fathoms), by Mr. M'Andrew, who remarks that "it is a common though rather deep-water species." I have obtained it at Scilly, Isle of Man, Mull of Galloway, Glenluce Bay, Clyde, and Hebrides; generally adheres to stones; only at Oban have I found it attached to the *Fucus*.

I have learned from Mr. Barlee that he obtained this species in Birterbuy Bay (County Galway), in the summer of 1845. 1847, I saw a specimen which was dredged off the coast of Waterford, near the Nymph Bank, in Mr. Warren's collection. Nov., 1849, I saw one in Mr. Warren's collection, which he found among a mass of *Caryophyllia Smithii* brought him from the Nymph Bank above four years ago.*

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* *Pecten Danicus*, Cham.
Pecten nebulosus, Brown's Illust.
In Dr. Farran's collection are specimens of this *Pecten*, purchased of a dealer

Genus LIMA.

L. Loscombii, Sow.

Dredged very sparingly, alive, in the deeper portions of Belfast and Strangford Loughs, on sandy and shelly ground. Single valves of large size obtained in quantity from 23 fathoms, at the entrance to the former, by Mr. Hyndman. Obtained occasionally in the stomach of haddock taken on the North-East coast. In that fish and in gurnard Mr. Humphreys has found it at Cork.

L. tenera, Turt.

The Ordnance Museum contains upon a card a fresh-looking specimen of this shell, and one of *Lima fragilis* labelled with the latter name, as dredged from 7 fathoms in Belfast Bay. *L. tenera* has long been known to me as found by Dr. Wm. M'Gee in a recent deposit of mud in Belfast Bay, close to the town.

Near Sana Island, off the Mull of Cantire, Mr. Hyndman dredged single valves of this species in profusion. See Paper in Ann. N. H., vol. x.

L. subauriculata, Mont.

Extremely rare. Two odd valves dredged from about 8 fathoms—sand—in Strangford Lough, in 1837, by Mr. Hyndman and W. T. In the course of a day's dredging in the following year I obtained a single valve in the same Lough.

Dead shells from Belfast Bay are in the Ordnance Collection. A single valve dredged from 23 fathoms—shelly sand—in this bay by Mr. Hyndman, with quantities of single valves of *L. fragilis* of large size.

DIVISION DIMYARIA.

Family AVICULADÆ.

Genus AVICULA.

A. Atlantica, Lam.

"It was first observed as a native by Miss Hutchins in Bantry Bay, and announced as British by Mr. Sowerby in his Min. Conch. i. 14." Flem. Brit. Anim., p. 405.

Dublin Bay, Dr. Turton; by whom it was found there.

Avicula hirundo is the name applied to the species in both instances. See Lam., vol. vii. p. 99, 2nd edit. In Mr. Warren's collection I have seen a specimen in 1839, which was found in the latter locality by that gentleman, and a second one in his possession was stated by the person from whom he obtained it to have been found there.

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who stated that he procured them from Lough Foyle, County Londonderry. This evidence, as Dr. Farran remarks, is not sufficient; but it seems desirable to notice the circumstance, as the species, which inhabits the western coast of Scotland, may probably occur on the neighbouring coast of Ireland. I have seen fine specimens from Lough Fyne, Argyleshire. *Pecten glaber*, Penn. and Mont., believed to be identical with this, has been obtained by Mr. Humphreys at Cork. (Ann. Nat. Hist., vol. v. p. 12.)

Family ARCADÆ.

Genus ARCA.

A. Noæ, Linn.

Fine and perfect specimens of the true *Arca Noæ* (according to Mr. Alder) are in Mr. Warren's collection; they were procured on the coast of Cork by Mr. Townsend.

Arca Noæ, Linn. "One specimen taken in Cork Harbour." Cork Fauna, p. 15 (all said of it).

A. fusca, Mont.

"A single specimen found on the islands called the Calves, so dangerous of access, in the West of Ireland." Turt. Brit. Biv., under the name *A. tetragona*. Magilligan, odd valves, W. T. Portrush in situ—Ordnance collectors. From Kenmare, Co. Kerry, imbedded in stone, Mr. Humphreys, in letter, 1809; abundant near Castletown, Co. Cork, Mr. Barlee, attached to valves of shells on a hard sand-bank at entrance of Birterbuy Bay, at a depth of 20 fathoms; in the fissures of rocks dry at low water in Clifden Bay, Dr. Farran. Burrowed in a stone from deep water off the Copelands, Sep., 1851, Mr. Hyndman.*

A. raridentata, Searles Wood.

A living specimen and a valve of this *Arca* were dredged from 45 fathoms off Cape Clear by Mr. M'Andrew. It is a *Crag* shell. Mr. M'Andrew procured it alive for the first time off the island of Skye in the summer of 1845.

A. barbata, Brown.

"This very perfect and new shell on our coasts was found alive, adhering to an oyster from Killinchy in Lough Strangford, by Dr. M'Gee of Belfast," Brown. Never found since.

Genus PECTUNCULUS.

P. pilosus, Linn.

Dublin coast, Br. Turt. More specimens (but all dead) have come under my notice on the sandy beach at Magilligan than elsewhere.

Dredged very sparingly from about 8 to 10 fathoms (sandy ground) in Strangford Lough, W. T.; from several fathoms deeper water at entrance to Belfast Bay, and Glenarm, Mr. Hyndman. "Two specimens, three inches in diameter, were found at Oyster Haven, in 1844," Mr. J. D. Humphreys.

Genus NUCULA.

N. margaritacea, Lam.

Dublin coast; plentiful, Brown. Common around the coast, gregarious; dredged at various depths to 50 fathoms (South Rock, Co. Down,

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* *A. lactea*, Linn.

This species is noted with a "?" in Turton's Catalogue as found on the Calves Islands. In his Conch. Dict., subsequently published, it is made synonymous with *A. perforans*.

In shell-sand, deep water, Belfast Bay, Mr. Hyndman.

Mr. Hyndman), on the Antrim and Down coasts, chiefly from a muddy bottom. I have met with it in the stomachs of different species of diving ducks, as well as occasionally in flat-fish, as sole, &c. Dredged in Clew, Clifden, and Killery Bays, 3—12 fathoms, in 1840.

N. tenuis, Mont.

Portmarnock, near Dublin, Mr. Warren.

N. nitida, Sow.

Dundalk, Portmarnock, and Youghal.

N. minuta, Mont.

"One valve in Dublin Bay," Brown. "West of Ireland; rare," Turt. C. D. p. 11. A scarce and deep-water species; Portrush, Mr. Hyndman. Dredged in Belfast Bay in a few instances, but rarely more than a few odd valves; obtained there from 23 fathoms (shelly sand) by the gentleman just named; who likewise dredged it from 50 fathoms off South Rock, Co. Down. Portmarnock, Mr. Warren.

N. Polii, Phil.

Mr. M'Andrew informs me that he dredged "some very young shells in May, 1848, near the Nymph Bank, at from 50 to 60 fathoms, and about as many miles from the Old Head of Kinsale, on the course from the Land's End. In June, similar specimens were dredged from 40 fathoms between Mizen Head and Cape Clear, about twenty miles off the land," Dublin Bay, Messrs. Clark and Warren.

Family MYTILIDÆ.

Genus MYTILUS.

M. edulis, Linn.

Gregarious; hab. between low and high water mark. Young densely covering over delicate sea-weeds, looking like strings of beads—so close together are they that they must either die for want of room or shift their quarters.

M. edulis, Linn., var. *incurvatus*. The only bivalve seen on Tory Island, where it is abundant, covering the rocks; observed by Mr. Hyndman.

Mytilus pellucidus, Pen. Don., vol. iii. pl. 81, also of *Thorpe*, fig. frontispiece.

Turt. B. Biv., p. 197, pl. 15.

Common in some parts of Belfast Bay.

MUSSELS. *March* 8, 1843. Captain M'Kibben tells me, that on a buoy (11 feet in diameter at the base) in Belfast Bay, cleaned after being five years "down," the entire circumference of the base for a foot of space always under water, was covered a foot thick with full-grown mussels; he thinks there could not have been less than half a ton of them taken off the buoy. The bases of these buoys in our bay become at once covered with mussels; those one year down, on being examined, are covered with them of about half the full-grown size, and those two years down do not, he thinks, display them of full size. I mention this with regard to the age of mussels. The mussels on the buoys are considered of a very superior quality, and have the great advantage of being quite free from sand, the water washing round them, keeping them quite pure.

Dec., 1844. The buoy noticed under date of March 8, 1843, after being cleaned and covered with tar, was again put down: on being taken up

the following year, the mussels on it were not more than ½ an inch in length.

Sept. 1, 1843. The light-ship was moored at Holywood Bank, and on being brought into dock, on Nov. 15, 1844, to have her bottom cleaned, it was covered with full-grown mussels, which were carried away by persons to eat. If we knew the size these were when they *moored themselves* to the ship, the problem is solved of how long they are attaining full size.

July, 1845. Mr. Hyndman showed me mussels nearly 1½ inch long, of which quantities were taken from the bottom of the pilot-boat after its being nine months afloat.

Genus CRENELLA.

C. decussata, Laskey.

A few odd valves dredged in rather deep water—shelly bottom—in Strangford Lough, Aug., 1837, Mr. Hyndman and W. T.

Genus MODIOLA.

M. vulgaris, Br.

Common on the North and North-East coasts in rather deep water on muddy and shelly ground; used as bait by fishermen in some places, but not commonly as human food; called horse-mussel. Apparently scarce or wanting in such of the bays of Mayo and Galway as were dredged by our party in 1840. *M. Gibbsii* took its place in some localities.

Modiola vulgaris. According to my journal, note of Dec. 14th, 1837, I find that full-grown individuals lived without water four days in a warm room, and that smaller individuals lived under similar circumstances eight days.

M. tulipa, Lam.

Very rare. Belfast Bay, Mr. Hyndman and W. T. Malahide, Dublin coast, one or two specimens, Dr. Lloyd. Portmarnock, very rare, Mr. Warren. Birterbuy Bay, Dr. Farran. In or near Bantry Bay, Mr. M'Andrew.

M. Gibbsii, Leach.

Dredged in Clew and Killery Bays by our party in 1840, 3—12 fathoms. *M. Gibbsii* is noted in Mr. Barlee's list of Birterbuy Bay species, with a query as to its being a variety of *M. vulgaris*. Youghal, very rare, Dr. R. Ball.

M. discrepans, Mont.

"Found on oysters in Dublin Bay," (O'Kelly); I have seen specimens from thence in Mr. Warren's collection. Larne Lough, not uncommon. Donaghadee, 8 to 10 fathoms, Dr. Drummond. Wicklow and Wexford coasts; Youghal, Dr. R. Ball. Cork harbour, Mr. Humphreys. Dredged in Killery and Clew Bays, in 1840. Birterbuy Bay, Dr. Farran. This is a much less common species than the following.

M. marmorata, Forbes.

Dublin coast and Strangford Lough, Brown. Common on the North and North-East coasts, more especially embedded in various species of *Ascidia:* found loose also, sheltering among *Balani* and other excrescences on oysters, &c.

Common on the back of the violet crab at Youghal, Miss M. Ball. Dredged in Killery Bay, and found among oysters from the western coast, W. T.

Birterbuy Bay, Mr. Barlee.

Nov., 1839. Having taken quantities of this *Modiola* from *Ascidiæ*,* and many within the last four weeks, I can state confidently that they were generally, and of all sizes, destitute of a byssus. The specimens I allude to were taken from very coriaceous *Ascidiæ*, in which they would of course less require to cast anchor than in those of a lighter and more tender substance. I remarked one individual, however, and with surprise, as having a rich yellow-coloured byssus. In masses of *Botrylloides* (large and small), on *Halidrys siliquosa* dredged from 5 fathoms; Belfast Bay, April 3rd, 1848.

M. vestita, Philippi.

This *Modiola* is included in my Report on the Invertebrata of Ireland, but without any specific name being applied to it. A reference to the above work, as soon as it appeared, showed that the Irish shell is the *M. vestita* known to Philippi only as found on the shore at Malta.

In a letter from Mr. Alder, written on the first of April, 1844, it was mentioned that among shells lately sent from the Mediterranean to Mr. King, Curator of the Newcastle Museum, were two specimens similar to the Irish shell: they "were embedded in sponge, and one inch and a quarter respectively in length, and a little thicker from being older shells, but in all other respects the same." In May last, I saw *Modiolæ* of this species from the Mediterranean in Mr. Cuming's unrivalled collection. The only Irish specimen of this shell yet known was procured, some years ago, at Youghal, by Miss M. Ball.

It is described and figured in the second edition of Brown's Illustrations, p. 132, pl. 37, fig. 36, under the name of *Modiola Ballii*.

Genus PINNA.

P. ingens, Mont.

One 10 inches long and 5 broad found at Skerries, Rutty's Nat. Hist. Dublin. "A very fine specimen was found at Portrush, Co. of Antrim, by Mrs. Clewlow of Belfast." Bantry Bay, Mr. Samuel Wright of Cork. Brown, Irish Test. "Cove in Ireland," Turt. C. D. To the Annals of Nat. Hist., vol. v. p. 13, I communicated the following note:

Pinna fragilis, Turt.	Brit. Biv.
— *papyracea*	—
— *pectinata*	—
— *muricata*	—

The three first-named, together with *P. ingens*, noted in a letter to me from Mr. John D. Humphreys as found at Cove; the two first and *P. muricata* by Dr. R. Ball, as obtained in the same locality (and at Youghal). Miss M. Ball informs me that *P. ingens* is very common on the

* I find them in many species. Savigny has, in his Mem., made the same remark: all they seem to look for in the *Ascidiæ* is sufficient consistence; yet I found one embedded in *Ascidia orbicularis*, Muller. I also find them, as Flemming has somewhere (Edin. Phil. Jour., April, 1823, p. 301) remarked, in *Botryllus Schlosseri* I obtained at Lambay island.

Nymph Bank, where it is known to the fishermen by the name of powder-horn—they roast the animal for food. *P. fragilis* outside Kinsale harbour, Cork Fauna. Although the *Pinna* is marked as found on each side of the island, it is very rarely met with except on a portion of the southern coast, where it is common. The very few specimens, all taken in deep water, which I have seen from the coasts of Londonderry, Antrim, Down, and Louth, were of large size, and all *P. ingens* or *P. fragilis* (Turt. Brit. Biv., pl. 20, f. 2). A specimen of *P. ingens*, 14 inches in length, dredged off Cape Clear, has been noticed as presented by Lieut. Wilson, R. M., to the Dublin Nat. Hist. Society, in 1844: the species was since dredged there by Mr. M'Andrew, but not living. A *Pinna* dredged in Belfast Bay, and now in Mr. Hyndman's cabinet, exhibits brownish-coloured pearls of the same colour as the shell itself. Mr. Barlee includes *P. fragilis* in his list of Birterbuy Bay shells, being the only note of *Pinnæ* found on the western coast, known to me.

Pinnæ. Feb. 17*th*, 1848.

Bernard Meenan sent me one dredged from 50 fathoms, off Island Magee. It is thence the *Pinnæ* are brought to Belfast; a circumstance of very rare occurrence, however. But B. Meenan states that he has at various times seen many of them which were taken there; being generally broken more or less, they are not brought to Belfast. B. M. believes they are taken by becoming entangled in the long lines, or by the line getting within the valves, and the animal closing them upon it.

Family UNIONIDÆ.

Genus ANODON.

A. cygnea, Turton.

The *Anodon* is known to me as found in suitable localities all over the island, except in the extreme South. The *Anodonta intermedia* (Pfeiffer, i. 113, t. 6, f. 3), I have obtained in the rejectamenta of the Lagan Canal, near Belfast. Specimens from the Grand Canal near Dublin, favoured me by Dr. Ball, are the *A. cygnea*, Pfeiffer, i. 111, t. 6, f. 4; and Rossmassler, fig. 342; and in Mr. Hyndman's collection is a very fine specimen, 3¼ inches long and 6¾ broad, from the Moyntaghs, Co. Armagh. From the Grand Canal also, and the river Shannon, I possess specimens of the *A. anatina*, Pfeiffer, i. 112, t. 6, f. 2: and from this last locality, likewise, I have the *A. cellensis*, Pfeiffer, i. 110, t. 6, f. 1, and Rossmassler, fig. 280. Of this last I have had the advantage of a comparison with English specimens, kindly sent me by Mr. Alder, and named *A. cellensis*, Pf. From the *Anodon* varying so much, not only according to locality, but in the same waters, I cannot coincide with the authors who make so many species. The four forms here noticed I venture with Mr. Gray to consider but one species: of the Irish specimens, which I have critically compared, none exactly agree with the *A. ventricosa* or *A. ponderosa* of Pfeiffer. W. R. Wilde, Esq., of Dublin, informs me that *Anodons* are thrown up in quantities on the shores of Lough Schur, County Leitrim, where they are eaten by the peasantry. *Sliggaun* is the common name applied to the *Anodon* in the North of Ireland.

Anodons. Mr. Evatt of Mount Louise, Monaghan, tells me that they are common in all the lakes there. At Clew Lough (Co. Monaghan) when drawing his net for trout, he has taken as many—and to his annoyance—as a man could carry, or what would fill three or four stable buckets.

Anodons, from Maghery Ferry, 1849 and 1850.

Genus ALASMODON.

A. margaritiferus, Gray.

This has for a long period been on record as an Irish shell; from papers published on the subject in the Philosophical Transactions, &c., Pennant drew the information which appears in his British Zoology.

It is indigenous to several of the northern counties, and to the South. By Capt. Brown it is noticed as found "in the river Slaney, Enniscorthy," p. 505. In the cabinet of Mr. Hyndman of Belfast are specimens from the river Bann, and from the County of Donegal. This species inhabits some of the tributary streams of Lough Neagh, and is plentiful in the neighbourhood of Omagh, County Tyrone, where, I have been informed, it was taken in such quantity in 1839, that the prisoners in the jail were employed in breaking the shells for manure. Mr. Humphreys of Cork notes it as abundant at Inchigeela, and as inhabiting the small rivers which run through Blarney and Glanmire (Co. Cork); at Curraghmore (Co. Waterford) it is stated by Dr. R. Ball to be found. The form to which M. Michaud has applied the name of *Unio Roissyi* is common to several localities in Ireland.

"Here are rivers which breed pearles," p. 14. O'Flaherty's West or H'Iar Connaught.

Mya margaritifera, river Anamoe, near the Seven Churches, Co. Wicklow; specimens thence given me by Mr. Warren, 1847.

Oct., 1839. *Pearls* in Lough Eask (Donegal), Mr. Robert Barklie has known taken in great quantity.

Killymoon, Co. Tyrone.

Pearl Mussels found in the river commonly, and are sought for on account of the pearls by the people of Coagh. Mr. Hyndman, Oct., 1851.

Alasmodon margaritiferus, *Nov.*, 1851. F. Davis brought me one from the river Bush, Co. Antrim, where he saw a number last autumn.

Family CAMACADÆ.

Genus ISOCARDIA.

I. cor, Linn.

Found in Dublin Bay by Mr. James Tardy, and at Cork by Mr. Samuel Wright, Brown. The following note appears in Mr. Templeton's MS. journal, under October 28th, 1811: "Received a drawing of the *Chama Cor*, from Mr. George Joy, taken by him from a specimen dredged up at Bangor (Belfast Bay)." The species is known by Mr. J. R. Clealand to have been dredged near the Copeland Islands, at the entrance of this bay. The Giant's Causeway and Bantry Bay are named by Turton (C. D. and Brit. Biv.) as localities in which it has been found; but very rarely. Berehaven, County Cork, Mr. John D. Humphreys. Dr. R. Ball some years ago obtained a number of this species from Dublin Bay, where it had previously, as well as elsewhere on the coast, been met with very rarely: of late years, however, it has proved to be by no means rare in that quarter. It is taken on the Kish Bank.

Glassdrummond, County Down, P. Doran.

Family CONCHACEÆ.

Genus CARDIUM.

C. echinatum, Linn.

Commonly thrown ashore on extensive sandy beaches. Dredged from oozy sand in Belfast and Strangford Loughs, Mr. Hyndman and W. T.

C. ciliare, Don. t. 32, f. 2.

Dublin Bay and Portmarnock; rather scarce, Brown's Irish Testacea. Is, according to Turton, the young of *C. echinatam*, Br. Biv., p. 184.

C. aculeatum is believed to have been erroneously introduced into the Irish Catalogue.

C. elongatum, Mont.

Noticed in Turton's Catalogue as from "Dublin Bay, rare," but in his subsequent works (Conch. Dict. and Brit. Biv.) Devonshire localities only are named. I have, however, seen specimens from Portmarnock in Mr. Warren's collection. It has been sparingly dredged in 1834, and subsequently in sand from 6 to 10 fathoms in Strangford Lough, G. C. H. and W. T.; also by us, in one instance, in Belfast Bay.

It is included in Mr. Barlee's list of Birterbuy Bay species, and in Mr. M'Andrew's of those dredged in or near Bantry Bay.

C. exiguum, Br.

Dredged in Belfast and Strangford Loughs, commonly from about 4 to 10 fathoms on muddy and shelly ground, Mr. Hyndman and W. T. Dredged at Red Bay (County Antrim), Mr. Hyndman; and in Clew, Clifden, Killery, and Roundstone Bays by our party in 1840.

C. nodosum, Mont.

As last, in the two first-named localities, excepting that it frequents deeper water, Mr. Hyndman and W. T. Dredged at Ireland's Eye, Dublin Coast, Mr. Hyndman; in Clew, Clifden, and Killery Bays in 1840, and found between tide-marks at Lahinch, W. T., &c. Birterbuy Bay, Dr. Farran, Mr. Barlee. Bantry Bay, 1834, W. T.

C. edule, Linn.

Common and gregarious, especially in shallow sandy bays, near low-water marks. Brought in quantities to Belfast for sale as human food, particularly from Strangford Lough. Attains a very large size on the Sligo coast and in Donegal Bay.

At the very extensive sandy bay called Lurgan Green, Co. Louth, huge rakes of the same form as hay-rakes are used in gathering cockles.

Var. *fasciatum*, Mont.

Young shells in my collection.

In some localities—Dundalk Bay (Mr. Hyndman), Ballysodare, Co. Sligo (Mrs. Hancock)—are coloured as this is described and figured by Montagu; as are full-grown shells from a lake of brackish water in the largest of the South islands of Arran (R. Ball and W. T., 1834): these are also very thin, as indeed the banded shells of all sizes are generally. I rather regard them as *C. edule* under peculiar circumstances than as a different species.

C. Lovëni, Thompson.

Shell of a somewhat rounded outline, with about thirty ribs, set with small scales; height and length equal; colour pure white. Length 3¼ lines; breadth 3¾; very thin and delicate; ribs rounded, about thirty in number, and becoming beautifully fine towards the beak; covered with minute closely-set transverse scales throughout, but which are more numerous on the ribs at each side; furrows about the middle of the valve smooth and shining, narrower than at the sides, where towards the base they are crossed by transverse scales, and towards the apex punctate; near the beaks they appear in the form of a mere linear depression.

Colour pure white, with somewhat of a pearly lustre inside and outside.

Compared with the British species of *Cardium*, this comes nearest *C. edule*, but is more handsome in form, sculpture, and colour. It is more rounded (less truncate at the anterior end), has the beaks terminating in a finer point, ribs more numerous and with the scales on them more closely set, but less elevated, the furrows narrower.

Cardium scabrum, Philippi. Enum. Moll. Siciliæ, vol. ii. p. 38, pl. 14. fig. 16, comes so near my shell, that future investigation may possibly show that they should be brought together; *C. scabrum* differs from it in having only twenty-six ribs, in the furrows being equal and punctate, and in its exhibiting two obscure violet rays, and having the beaks yellow; but as my specimens were not seen in a living state, stress need not be laid on the difference of colour. This species was obtained in three localities nearly about the same time. In October, 1841, numbers of it, but mostly broken, were found by Dr. Farran in the stomachs of sole (*Solea vulgaris*) and plaice (*Platessa vulgaris*) purchased in Dublin market, and taken off the eastern coast; in June, 1842, Mr. Hyndman dredged a few specimens from a depth of 50 fathoms, off the South Rock, coast of Down; and specimens which I have seen in Mr. Cuming's unequalled collection were sent him by Dr. Lovën, 1842, as a species unknown to him, and which had been obtained on the west coast of Sweden. It is named in honour of this distinguished naturalist.

Among some minute shells, dredged in 1846 in or near Bantry Bay by Mr. M'Andrew and kindly given to me, is one of this species. I saw specimens of Dr. Farran's from Birterbuy Bay.

Should *C. scabrum* prove identical, in four localities—from Sweden to Sicily—this has been subsequent to the publication of Philippi's first vol. in 1836; and the species is for the first time described in his second vol., which appeared in 1844.

Mr. Hanley informs me that Philippi considers *C. nodosum*, Mont., this species.

C. lævigatum, Linn.

"Portmarnock, Bantry Bay," Turt. Dredged off Glenarm, in Belfast and Strangford Loughs, sparingly, Mr. Hyndman and W. T. Clew Bay, 1840.

Birterbuy Bay, single valves dredged from 18 to 20 fathoms, hard sand, Dr. Farran. South Isles of Arran, Mr. Barlee.

In Bantry Bay it seems to be in greater numbers than ordinary.

Large and abundant on Nymph Bank, R. Ball.

Genus DONAX.

D. trunculus, Linn.

Generally common on extensive sandy beaches. Plentiful close to low-

water mark at Magilligan, where it is collected by the people for food. Dredged plentifully, but of small size, on pure sand, at a few fathoms' depth off Newcastle, Co. Down, Mr. Hyndman and W. T.

In lake of brackish water in largest South Isles of Arran, Dr. R. Ball and W. T., 1834.

D. denticulatus, Linn.

"One very small valve in sand from Portmarnock," Brown. "Western coasts, very rare," Turt. Catal. Irish Shells only. A specimen said to be from Magilligan is in Mr. Hyndman's collection.

D. complanatus, Mont.

(W. T., Ann. Nat. H., vol. v. p. 13.) Bantry Bay, Mr. Humphreys, &c. Dead specimens dredged near South Isles of Arran, Mr. Barlee.

Genus ERVILIA.

E. castanea, Mont.

Procured with the valves united on the coast of Galway, by Mr. Barlee, in 1848. All previous specimens obtained on the British coast (off Cornwall and the Scilly Islands) were but single valves, according to the work particularly referred to for this species.

Genus TELLINA.

T. fabula, Don.

Dublin coast, Br. Turt. Not uncommon on extensive sandy beaches, as Portmarnock and Magilligan, W. T. Found from below low-water mark to a few fathoms, on sand.

Specimens found in the stomachs of plaice (*Platessa vulgaris*), caught on the Dublin coast, have been given to me by Dr. Farran. Ardmore, Mrs. Mackesy.

T. tenuis, Don.

Dublin coast, Br. Turt. A common gregarious species found commonly about low-water mark in sand, and like *T. fabula* to a few fathoms' depth. The plaice in Belfast Bay feed very much on *T. tenuis*.

Dundalk Bay, Mr. Hyndman. Dredged in Clifden Bay, 1840. On some parts of the Galway coast, said by Dr. Farran to be eaten by the people.

T. squalida, Pultn.

Dublin coast, Br. Turt. Found sparingly on sandy coasts.

Red Bay, Co. Antrim, Mrs. J. Thomson Tennant, and Dundalk, Mr. Hyndman, may be named as additional localities.

T. Donacina, Linn.

Bantry Bay, Dublin coast (one valve), and Bray (Mr. M. J. O'Kelly), were noticed by Brown and Turton as localities for this species. The first-named locality is its chief one known to me in Ireland; at Portmarnock it is but occasionally found. Specimens have but rarely been dredged by us in Strangford Lough (Mr. Hyndman and W. T). And I once met with it in the stomach of a haddock, taken on the open coast of Down. Birterbuy Bay, Dr. Farran, Mr. Barlee. From Co. Clare, in Mr. Warren's collection.

Ardmore, Mrs. Mackesy. Bantry and Dalkey, R. Ball.

T. crassa, Penn.

Bantry Bay and Dublin coast are known as habitats for this species; the former, as in the case of the last species, apparently its chief abode. Single valves dredged in Belfast Bay, from 10 to 12 fathoms, on soft sand, by Mr. Hyndman. Obtained at Balbriggan, Co. Dublin (a single specimen), and at Ballysodare, Co. Sligo, Mrs. W. J. Hancock.

Sana Island, 1841, Mr. Hyndman.

T. balaustina, Linn.

A living specimen and two valves of this species, as determined by Mr. G. B. Sowerby, were dredged from about 14 fathoms with *Pleurotoma teres*, in Birterbuy Bay, by Mr. Barlee, in the summer of 1845. It has not before been noticed as inhabiting any of the coasts of the British islands.

T. bimaculata, Linn.

The species marked with doubt in Turton's Catalogue, as found in the "South of Ireland; very rare." Dr. R. Ball notes his having a specimen from Bantry Bay, and one from the coast of Clare (Prof. Harvey); one obtained alive at Ardmore, Co. Waterford, by Mr. Warren: three specimens thence are in his collection, one found at Pilltown estuary, Co. Waterford, by Mrs. Mackesy, and two near Youghal by Mrs. Moss of that town (Farran in letter).

T. solidula, Mont.

Dublin coast, Br. Turt. A common species in shallow water, and between tide-marks on sand (at Magilligan) and ooze (in Belfast Bay). Dundalk Bay, where it is of a fine yellow hue, Mrs. Hancock.

T. pygmæa, Phil.

Specimens procured on the coast of Cork, by Mr. John D. Humphreys, are, as Mr. S. Hanley informs me, in Mr. Jeffreys' collection at Swansea. Galway, Mr. Barlee.

Genus LUCINA.

L. radula, Mont.

Dublin coast and Cove, Turt. Br. Widely distributed round the coast, but not obtained in quantity. Dredged from about 6 to 12 fathoms on sand in Belfast and Strangford Loughs (Mr. Hyndman and W. T.). Red Bay, Co. Antrim.

Lake of brackish water, in largest of South Isles of Arran, Dr. R. Ball and W. T., 1834. Ballysodare Bay, County Sligo, Mrs. Hancock. Dredged in Clew Bay, 1840.

L. rotundata, Mont.

Bantry Bay, Br. Turt. This is the only locality known to me for this species, and it is not rare here, excepting Birterbuy Bay, where it was found by Mr. Barlee, in 1845.

L. lactea, Lam.

Procured off the South-West coast, by Mr. M'Andrew; off Baltimore Harbour, 30 fathoms; and from 12 to 15 fathoms in Bantry Bay.

L. spinifera, Mont.

The species noticed with doubt in Turton's Catalogue as found at "Portmarnock; very rare." About 1834, it was noted similarly (excepting

the doubt about the species) by Prof. Harvey. The Bays of Mayo and Galway are its chief abode.

By Major M'Ilroy of Westport I was, in 1840, favoured with a specimen from Clew Bay; about the same time it was dredged in Killery Bay, from about 8 to 12 fathoms on oozy ground. In Birterbuy Bay it was procured in some quantity and very large, by Dr. Farran. With respect to Clifden Bay, Mr. Barlee remarked in a letter to me dated Sept., 1845, that he found no shells abundant there but *Turritella terebra*, *Lucina spinifera*, and *Amphidesma Boysii*. Mr. M'Andrew dredged it in or about Bantry Bay. At Red Bay, Co. Antrim, I found a valve of this species; one was brought up during Capt. Beechy's dredging off the Mull of Galloway, on the coast of Scotland, depth 145 fathoms.

L. flexuosa, Mont.

Dublin coast, Br. Turt. Widely distributed, but in sparing numbers. Dredged in Strangford Lough from 15 to 20 fathoms, muddy bottom, 1846; previously obtained there from about half that depth, and on sand, Mr. Hyndman and W. T. Dredged off Bundoran, and in Clew and Killery Bays, in 1840.

Genus AMPHIDESMA.

A. prismatica, Laskey.

This species, although found on each side of the island, is by no means generally distributed. I have found it thrown ashore on the sandy beach of Magilligan and Belfast Bay; in which latter it has been dredged from 20 fathoms (sandy ground) by Mr. Hyndman; who likewise brought it up from 50 fathoms off the South Rock, Co. Down.

A. Boysii, Turt.

Dublin coast, Turt. Br. The most generally distributed species of this genus. Dredged in Belfast Bay and Strangford Lough sparingly, from oozy sand, at a depth of about 8—10 fathoms. Dundalk Bay, Mr. Hyndman. Dublin coast, Miss M. Ball. Dr. Farran has favoured me with very fine specimens from the stomach of sole taken on the Dublin coast. Dredged in Clew, Clifden, and Killery Bays, in limited numbers, 1840.

A. tenuis, Turt.

I have received specimens of this well-marked species from Larne Lough, County of Antrim. Dr. Farran includes this in his list of Birterbuy Bay shells, and Mr. Warren writes to me (Feb. 1847) that he has obtained it at Portmarnock.

Amphidesma intermedia, Thompson.

Shell oval—oblong, nearly equilateral, white with prismatic colours. Length 2¾ lines; breadth 4; thickness 1¼; beaks almost central; shell nearly equilateral, rounded at each end, more particularly at the posterior; thin, semi-transparent, glossy, white with prismatic hues. This species is intermediate in form or outline between *Amph. prismatica* and *A. Boysii*, and also in general characters, but on the whole may perhaps be said to approximate the latter more nearly; its form, however, at once marks it as distinct from *A. Boysii*, than which it has the beaks more central, is broader and more equilateral, has the apex rather more marked and pointed, and is beautifully iridescent inside and outside; the teeth do not present any marked differential characters.

Two examples of this species were dredged from a depth of about 6 fathoms in Strangford Lough, near Portaferry, in August, 1837, by Mr. Hyndman and myself; and two more were in like manner procured by us in July, 1840, when, with Prof. Edward Forbes and Dr. R. Ball, dredging in Killery Bay on the western coast—depth from 3 to 12 fathoms.

Mr. Barlee includes it in his list of Birterbuy Bay shells dredged in 1845, and Mr. M'Andrew in his list of species taken in or near Bantry Bay, in 1846.

April 21, 1848. A valve of it, and one of *A. Boysii*, found in a large plaice caught in Belfast Bay by E. Getty, Esq. The stomach and intestines were almost filled with *Solen pellucidus*.

There were also a *Corbula striata* and a *Venus laminosa*.

Genus CYPRINA.

C. Islandica, Linn.

Dublin Bay and Bray, Br. Turt. Commonly found on extensive sandy beaches, as Magilligan, Portmarnock, &c. Dredged in Belfast and Strangford Loughs, on sand and mud from about 5 to 12 fathoms, living; dead shells obtained from the greatest depths there—about 25 fathoms, Mr. Hyndman and W. T. Dredged in Dublin Bay (Dr. Ball and W. T.), and in or near Bantry Bay, by Mr. M'Andrew. Not included in the lists of species from the western coasts, nor was it obtained by our party in 1840, by occasional dredging or otherwise, from Bundoran to the South Isles of Arran.

C. minima, Mont.

Miltown Malbay, rare, Professor Harvey; Youghal, very rare, Miss M. Ball; Bantry Bay, Mr. Humphreys, Mr. Barlee, and Mr. M'Andrew; Birterbuy Bay, Dr. Farran, Mr. Barlee. I have seen a specimen from Erris, Co. Mayo (Miss Bingham), in the collection of Mr. Warren.

" Portmarnock, very rare," Turt. Belfast Bay, Mr. Hyndman.

Genus MACTRA.

M. solida, Penn. Dublin Bay, Br. Turt.

Although found on each side of the island, not generally distributed: it is chiefly met with thrown ashore on extensive sandy beaches. Magilligan and Portmarnock are the chief localities in which it has occurred to myself; in both of them *Sertularia argentea* is often found parasitic on it.

Red Bay and Larne, Co. Antrim, W. T. Ballysodare, Co. Sligo (a monstrous var.), Mrs. Hancock. This is the only western habitat, in the MS. catalogues consulted.

M. elliptica, Br. Portmarnock, W. T.

Belfast and Strangford Loughs; dredged in the former from 20 fathoms, shelly sand: specimens dead in both localities.

M. truncata, Mont.

Dublin coast, not uncommon, Br. Turt. Found near low-water mark in sand; brought to Belfast with cockles for sale, and together with *Venus aurea*, similarly obtained, commonly called *lady cockle*. Red Bay, W. T. Ballysodare; the remark in reference to this locality under *M. solida* equally applies to the present species.

M. subtruncata, Mont.

"Dublin coast; sparingly," Turt. Br. Dredged from 10 to 12 fathoms on sand in Strangford Lough, Mr. Hyndman and W. T. Dredged in Killery, Clifden, and Clew Bays, in 1840.

M. stultorum, Linn.

"Dublin Bay and Dundrum sands," Brown. Although generally common where it is met with—living on sandy beaches—below low-water mark, and found on every side of the island, by no means generally distributed.

Red Bay (Antrim), Newcastle (Down), Mr. Hyndman and W. T. Clifden Bay (Galway), W. T.

Var. *M. cinerea*, Magilligan; Portmarnock, W. T.; Youghal, R. B.

Genus GOODALIA.

G. triangularis, Mont.

"Ireland," Turt. B. Biv.;—all that is said of it as found on our coasts. Dredged once in shell-sand from about 10 fathoms near Portaferry, Strangford Lough, Mr. Hyndman, W. T., 1847. I saw a specimen from Kilkee, Co. Clare, in Mr. Warren's collection. Belfast Bay, Mr. Hyndman. At Dalkey a single living specimen got by dredging, 1840.

Var. *minutissima*, Mont.

"Drifted sand at Portmarnock," Turt. Catal. "Dublin Bay," Turt. C. D. p. 88. The only locality named in the Brit. Biv. is "Cornwall." I saw specimens from Kilkee in Mr. Warren's collection. Found at Sana Island with last.

Genus LEPTON.

L. squamosum, Mont.

A single valve obtained in Cork harbour, Aug., 1843, Dr. R. Ball, Prof. E. Forbes. Birterbuy Bay, Mr. Barlee; and adjoining Roundstone Bay (one specimen), Dr. W. H. Harvey. In or near Bantry Bay, Mr. M'Andrew:—taken by dredging in all these instances.

Genus GALEOMMA.

G. Turtoni, Sow.

An imperfect valve was dredged from the Nymph Bank by Mr. M'Andrew in 1848.

Genus KELLIA.

K. suborbicularis, Mont.

Dublin Bay, Turt. C. D. Mr. Warren lately obtained it in this locality. The western coast, bays, and exposed shores seem to be its favourite residence; in addition to the localities indicated in the table, it was dredged in Clew, Killery, and Clifden Bays, in 1840, by our party. M. Malbay and Bundoran, where it was found cast ashore on the sands, and noted as common at the former, are exposed coasts. In the bays named

(and Dr. Farran makes the same remark with respect to Birterbuy Bay) we found it generally within dead bivalves.

K. rubra, Mont.

Among mussels (*Mytili*) on the shores of the Skerries, islands off Portrush; and about the roots of growing sea-weeds between tide-marks. Belfast Bay; Wicklow coast, W. T. In shell-sand sent me from Kilkee, Co. Clare.

Genus MONTACUTA.

Montacuta substriata, Mont. (sp.)

Found on the purple urchin (*Spatangus purpureus*), dredged from 25 fathoms, at the entrance of Belfast Bay, by Mr. Hyndman, in May, 1842.

M. bidentata, Mont.

"Imbedded in the back of old oyster-shells about Cork and Dublin Bay," Turt. Catal. Bangor, Belfast Bay (one specimen), 1834, Mr. Hyndman and W. T. Bundoran, Mr. Warren.

M. ferruginosa, Mont.

Dublin coast, Turt. Whence only have I yet seen specimens. Several specimens taken in fine sand from thirty fathoms between Baltimore Harbour and Cape Clear, by Mr. M'Andrew, who adds, "frequent in company with fine living specimens of *Eulima subulata*."

M. ovata.

Specimens of this shell from the southern coast are in Mr. Hyndman's cabinet, as are some in Mr. Warren's from Portmarnock sands. Several found on the beach at Bundoran by Mrs. Hancock.

M. purpurea, Hanl.

In profusion about the roots of plants growing on rocks accessible at low-water, and also on the leaves of those growing on the oozy banks of Belfast Bay: the shoals of mullet (*Mugil chelo*) consume vast quantities of them when roving over these banks, feeding in spring and summer. Larne Lough; Dublin Bay, W. T. From the coast of Clare, in Mr. Warren's collection.

Genus CYCLAS.

C. cornea, Lam.

Commonly distributed over the island, occurring in small ponds, &c., as well as lakes and rivers,—the var. β. of Jenyns and other varieties not unfrequent. In summer I find the *C. cornea* of all sizes, abundant in masses of *Conferveæ*, floating on the surface of the water.

Cyclas lacustris, Turt.

Is rare and local in Ireland; occurs in the East and South. To Dr. R. Ball of Dublin I am indebted for specimens which were taken by him many years ago in a pond at Tallaght, a few miles from the metropolis;

he has also procured some at Youghal; in Mr. Hyndman's cabinet, is a specimen from another locality in the South. By Mr. T. W. Warren of Dublin this *Cyclas* has been obtained in a pond in the Phœnix Park, and in the Grand Canal near that city. And by Dr. Coulter in Lord Roden's demesne, Dundalk. Dr. Hincks has lately procured it near Cork.

Genus PISIDIUM.

P. obtusale, Pfeiffer ?

This, with the exception of *P. Henslowianum*, would seem to be the rarest of the *Pisidia* in Ireland. In two localities in the County of Down, it has occurred to me, in a drain cut through clay soil, in a brickfield near Bangor, and in a pond at Portavo, the seat of D. Ker, Esq., M. P. A single specimen has been taken at Finnoe (County Tipperary) by Edw. Waller, Esq.

Pisidium nitidum, Jenyns,

Is somewhat generally distributed in Ireland. It is abundant in a cold turfy deposit, conveyed by a mountain-stream to a pond at Wolfhill near Belfast; and on the *Utricularia vulgaris* growing in stagnant pools, excavated in brick-making, close to the town. These places are of a very different nature, the pond at the former being supplied with clear spring water, and at an elevation of nearly 600 feet above the sea, the latter but a few feet above it, and supplied only with rain water. In the West I have obtained this species in Lough Gill, County Sligo. From about Portarlington it has been sent me by the Rev. B. J. Clarke, and from Finnoe, by Edw. Waller, Esq.

Pisidium pusillum, Jenyns,

Is the most common of the genus in Ireland, and universally distributed. It is generally to be met with in ponds, drains, &c.; but in marshy spots, both in this country and in Scotland, I have found it in company with, and adhering to, the same stones as land Mollusca, which inhabit such places, as *Vertigo palustris*, &c. In the North and South of Ireland I have procured it among moss, which was kept moist only by the spray of the waterfall.

Pisidium pulchellum, Jenyns.

This handsome and well-marked species is generally distributed over the island. It inhabits stagnant and running water of the least, as well as the greatest, extent; and at the same time and place may be found on various subaquatic plants and buried in the mud. The largest and finest specimens I have procured were from the gently-flowing river Main, near its junction with Lough Neagh.

Pisidium Henslowianum, Jenyns.

The addition of this species to our Fauna is due to Edw. Waller, Esq., who has favoured me with the inspection of a few specimens which he procured at Finnoe, County Tipperary.

Pisidium amnicum, Jenyns,

Although not very common, is widely distributed over the island, and is known to me as occurring in every portion except the extreme South.

Capt. Brown noticed as localities—"in a stream near Clonooney; in the Grand Canal, and in the Liffey, plentiful," p. 508; in this river it attains a very large size. In the river Main, near its junction with Lough Neagh; in the rejectamenta of this lake near Toome, and in that of the river Lagan, near Belfast, I have found the *P. amnicum*. Ballitore (County Kildare), Limerick, and Miltown Malbay, are noticed by Professor Harvey as localities. From the river Barrow, near Portarlington, the species has been sent me by the Rev. B. J. Clarke.

Pisidium cinereum, Alder,

Is not common, but is widely distributed in Ireland, being found in the North, East, West, and South. In Sept., 1833, I first met with it in a moist spot in the wood at Holywood House, County Down, and have since obtained a very few specimens in different parts of this County and of Antrim. Among *Pisidia* collected at Youngrove, near Middleton (County Cork), by Miss M. Ball; at Killereran (County Galway) and Portarlington, by the Rev. B. J. Clarke; and in the neighbourhood of Dublin, by T. W. Warren, Esq., is the *P. cinereum*.

Genus ASTARTE.

A. Danmoniensis, Sow.

Bray and near the Giant's Causeway, Turt. Br.

Dredged off the Co. Antrim coast; in Belfast and Strangford Loughs sparingly, from about 8 to 25 fathoms, on mud and sand, Mr. Hyndman and W. T. Appears to be extremely scarce at Youghal and Cork, where it has been met with in the South. Not included in any of my western lists.

A. Scotica, Flem.

"Dredged at Bray; not common," O'Kelly. All the remarks in the last apply equally to this.

Genus ARTEMIS.

A. exoleta, Linn.

Dublin coast, Br. Turt. Common on most sandy coasts.

Dredged from 5 to 10 fathoms on sand in Belfast and Strangford Loughs, Mr. Hyndman and W. T.

Larne Lough, W. T.; Ballysodare, Co. Sligo, Mrs. Hancock.

A. lincta, Pult.

Taken as last and in same localities.

A. undata, Penn.

Dublin coast, Belfast Bay, western coasts, Br. Turt. Not uncommon on most sandy coasts. In addition to the places indicated, obtained in Killery Bay in 1840.

Genus CYTHEREA.

C. ovata (Br. Turt.).

A rather common species. Dredged alive in Belfast and Strangford Loughs, from 10 to 20 fathoms on oozy ground. Larne Lough, Mr. Hyndman and W. T. Dredged in Killery and Clew Bays in 1840.

Genus VENUS.

V. verrucosa, Linn.

"Wexford, rare," Brown. "Bray and Bantry Bay," Turt. Mr. Hyndman's cabinet contains a young shell (*V. cancellata*) given him as from Magilligan. Turton's notice of Bray is all that I know of it on the East coast. The South and West are at all events its chief abode.

Ballysodare, Co. Sligo, Mrs. Hancock. Clifden Bay, Mr. Hyndman and W. T., &c. Birterbuy Bay (obtained at low-water mark by digging 8—10 inches), Dr. Farran. Coast of Clare, Dr. Ball.

V. casina, Linn.

Bray, Br. Turt. *V. reflexa*, "Bantry Bay; very rare." Turt.

Pretty generally distributed, in sparing numbers. Dredged in Belfast and Strangford Loughs, from 10 to 20 fathoms, on soft sand, Mr. Hyndman and W. T. Ballysodare, Mrs. Hancock. Dredged in Killery Bay in 1840, W. T., &c., and South Isles of Arran, Mr. Barlee ("*V. reflexa*").

V. fasciata, Don.

Dublin coast, Bantry Bay, Br. Turt. Not uncommon.

Dredged occasionally alive from 8 to 23 fathoms, on sandy ground, in Belfast and Strangford Loughs, Mr. Hyndman and W. T. Ballysodare, large and highly-coloured, as indeed are all the shells of this family there when mature; collected by Mrs. Hancock. Bantry Bay seems its favourite locality; by Dillwyn it was remarked as "very common" here. Dredged near the South Isles of Arran by Mr. Barlee.

V. Pennantii, Forbes.

Bantry Bay, Turt. Magilligan, Belfast, Strangford, and Birterbuy Bays. Not common.

Killery Bay, where it was dredged between 3 and 12 fathoms in 1840.

V. gallina, Linn.

Dublin coast, Br. Turt.; common. Thrown ashore on the sandy beach of Magilligan in quantity and of large size. Found alive from low-water mark to 8 and 10 fathoms on the North and North-East sandy coasts. Dredged in Killery Bay in 1840.

V. sinuosa, Penn.

"Dublin Bay; rare," Brown. "Taken alive in Dublin Bay," Turt. C. D. p. 249. Dredged in or near Bantry Bay, 1846, Mr. M'Andrew.

Genus PULLASTRA.

P. aurea, Br.

"Dublin Bay and Portmarnock (Dr. Turton); Bantry Bay (Dr. Taylor); Carrickfergus Bay (Dr. M'Donnell); rare." Brown. "Valentia Harbour, Co. Kerry." O'Kelly, in Penn. Brit. Zool. vol. iv. p. 240 (Dublin edit.). Not uncommon in the localities indicated in the table, in addition to which Clifden and Clew Bays (where it was dredged from the depth of a few fathoms) and the coast of Clare (Dr. Ball) may be named.

Found in sand from about low-water mark to a few fathoms' depth.

V. ænea and *V. nitens*, Turt., are noticed by that author as found buried in the blue clay at Clontarf, near Dublin. The former I have taken alive in Strangford Lough; and specimens similarly found in Bantry Bay are in Dr. Ball's collection.

P. perforans, Br.

"Portmarnock, and in stones at Howth." Brown.

A common species, on sandy beaches, near to and below low-water mark, as well as the following form or species. Inhabits the exposed coasts of Antrim and Down, as well as the bays; the *P. perforans* being apparently the more common in such localities. Found within apertures in indurated clay with *Pholas candidus* and *P. dactylus*; at Carrickfergus in apertures in limestone; and in Belfast Bay and elsewhere. Ballysodare, Mrs. Hancock.

P. vulgaris, Sow.

"Dublin Bay and Portmarnock, plentiful." Br. Turt.

What is said of localities under the last species equally applies to this. In addition, Lahinch (Co. Clare) and Killery Bay may be named (W. T., &c.).

P. decussata, Br. Dublin coast, Br.

A common species; near to and below low-water mark. Coast of Louth (W. T.); Ballysodare (of large size and highly coloured; plentiful, Mrs. Hancock). Clifden and Killery Bays, W. T., &c.

P. virginea, Br. Bray; Portmarnock, Br. Turt.

A common species. Dredged in Belfast and Strangford Loughs, chiefly from about 10 to 20 fathoms, on sand and mud. Ballysodare, Mrs. Hancock. Clew and Killery Bays, W. T., &c. In a lake, brackish water, largest South Isles of Arran (Arranmore), Dr. R. Ball and W. T., 1834.

Var. *V. Sarniensis*, Turt. Brit. Biv., is taken in Belfast Bay, on the Dublin and southern and western coasts.

Genus VENERUPIS.

V. Irus, Linn.

"At Miltown Malbay this shell always inhabits sponges or sea-weeds; often the roots of *Laminaria bulbosa*." Professor W. H. Harvey. Dr. Farran mentions his finding a *V. Irus* on the exposed granite rocks at Birterbuy Bay, to which it moored itself by strong threads similar to those of the byssus of the mussel.

Genus PETRICOLA.

P. ochroleuca, Lam.

Bantry Bay, Miss Hutchins; Dr. Turton, Br. Turt., Dublin (sub-fossils) and Valentia added in Turt. Brit. Biv. Found alive at Bantry Bay by Mr. Warren, and dredged quite recent (the animal dead within the shell) in Birterbuy Bay by Dr. Farran. Not uncommon in a deposit of blue clay in Dublin Bay, where it was found many years ago by Mr. Furlong (O'Kelly, in Penn. Brit. Zool.). In 1840 I procured it there from the same material brought up from a depth of several feet. Ardmore, Mrs. Mackesy.

Family PYLORIDÆ.

Genus CORBULA.

C. striata, Flem. Dublin coast, Br. Turt.

Although found on each side of the coast, not generally distributed;

rarest on the West coast. Birterbuy Bay (Dr. Farran) is the only locality in my lists for it in that quarter. Strangford Lough is the best locality known to me for this species, in some parts of which it is common on muddy ground, at a depth of about from 4 to 10 fathoms. Kingstown Harbour, R. Ball.

Genus SPHÆNIA.

S. Binghami, Turt.

Two valves found at Bray many years ago by Professor W. H. Harvey. Birterbuy Bay, Mr. Barlee.

Genus NEÆRA.

N. cuspidata, Olivi.

Cape Clear, 60 fathoms, Mr. M'Andrew.

Genus PANDORA.

P. obtusa, Leach.

Dredged off Carrickfergus, Sept., 1835, Mr. Hyndman; subsequently by Mr. H. and myself in Strangford Lough.

Genus THRACIA.

T. convexa, Wood.

Three specimens were got by Mr. Warren off the Dublin coast, with the animal in a fresh state. They were full-grown. Cork Harbour, Mr. Humphreys. Bantry Bay, Mr. M'Andrew. Also in Strangford Lough, and near Belfast, in the cuttings for the new channel, Mr. Hyndman.

T. pubescens, Pult.

Belfast Bay. Near Dublin, Mr. Warren. Birterbuy Bay, Mr. Barlee.

T. declivis, Thor.

Belfast and Strangford. Dublin, Mr. Warren. Bantry Bay, Mr. M'Andrew. Cork, Mr. Humphreys.

T. distorta, Mont.

Very rare. Youghal, in limestone, Dr. Ball. Cork Harbour, Mr. Humphreys. Dublin Bay and Bray, Prof. W. H. Harvey. 1847, I saw it from Portmarnock in Mr. Warren's collection. In limestone near Belfast, with *saxicava*, Mr. Grainger.

Genus ANATINA.

A. prætenuis, Turt.

Dublin coast, O'Kelly; Turton. "Belfast Lough, rare," Brown. The latter locality probably a mistake. Portmarnock is the only Irish locality named in the author's latest work, Illust. Brit. Conch. 2nd edit. Magilligan is the only northern locality in which the species has yet been met with by Mr. Hyndman or myself; it is thrown ashore quite fresh there. On the Dublin sandy coasts I have likewise found it. Bantry, Miss M. Ball. Cork Harbour, rare, Mr. Humphreys. Rather a scarce species.

Genus MYA.

M. truncata, Linn.

A common species, littoral on sandy coasts.

M. arenaria, Linn.

Plentiful in localities on every side the coast. Frequently buried in the soft sand of Belfast Bay, between tide-marks. Dug out and eaten by some of the poorer people here, as it is on various parts of the coast.

Ballyshannon, Co. Donegal; Sligo coast, Killery Bay, W. T., &c.

Genus LYONSIA.

L. Norvegica, Chem.

Two valves found by Miss Hutchins in Bantry Bay, in Dr. Taylor's collection, Brown.

A very rare species, though widely distributed. Dredged in Belfast and Strangford Loughs, in from 6 to 12 fathoms, among sea-weed.

Dublin coast, Dr. Ball, &c. Birterbuy Bay, Dr. Farran, Mr. Barlee. A single valve, Cork, Mr. Humphreys. Dredged in or near Bantry Bay, Mr. M'Andrew.

Genus LUTRARIA.

L. vulgaris, Flem.

Like *Mya arenaria*, plentiful in localities on all sides the coast; and in those of a nature similar to those where that species occurs. Used as edging to garden plots by the cottagers at Bundoran, where it is abundant, Mrs. Hancock.

L. hians, Flem.

About Cove, rare, Turt. Catal. Magilligan, Mr. Hyndman. Bantry Bay, Mr. Humphreys. Found in a recent deposit of blue clay excavated for a dock at Belfast, Dr. Wm. M'Gee. 1847, I saw specimens from Dublin Bay in Mr. Warren's collection.

L. compressa, Lam.

Dublin coast, Br. This should not perhaps have been noted in the Belfast Bay column, as, though not uncommon in a dead state, it has not been found alive to my knowledge.* Dundalk and Clontarf (Dublin Bay), recently dead, and *in situ* between high and low water mark, Mr. Hyndman. Youghal, Dr. Ball. Mud-banks, Cork Harbour, common, Mr. Humphreys.

Genus PSAMMOBIA.

P. Tellinella, Lam.

Ireland, Turt. Rather rare, except perhaps at Bantry Bay, whence specimens have been supplied me by Dr. Ball. Dredged very rarely in Belfast and Strangford Loughs, from about 10 fathoms, sandy ground. Dublin coast, Mr. Hyndman and W. T. Mr. Warren, in a letter dated February 3rd, 1847, remarked, "A few days ago I found at Portmarnock 147 good living specimens of *Psam. florida*, though I had seldom obtained more than a single specimen there at one time before." Birterbuy Bay, Dr. Farran, Mr. Barlee. The latter gentleman dredged near the South Isles of Arran the var. with about ¼ of each valve striated.

P. Ferroensis, Chemn.

Dublin coast, Br. Turt. Commonly thrown ashore on most sandy

* Possibly it may only have to be dug for to be so obtained. It is found on the muddy banks of the river Lagan, nearly as far up as the tide flows.

beaches. Inhabits below low-water mark. Red Bay, Co. Antrim, W. T.; Dundalk Bay, Mr. Hyndman; Killery Bay, dredged from a few fathoms by our party, in 1840. Ardmore, Mrs. Mackesy.

P. vespertina, Turt.

Bantry Bay, Brown. Portmarnock, Turt., rare. From Larne Lough, Co. Antrim, a specimen has been sent me.

I have not noted any specimens from the Dublin or other eastern coast, as seen in collections or obtained there; hence Portmarnock remains on Turton's authority only. Youghal, Bantry Bay, Dr. Ball, to whom it is unknown as a Dublin species. One specimen found in Cork Harbour, Mr. Humphreys. Galway coast, Professor W. H. Harvey. Birterbuy Bay, Dr. Farran.

Genus SOLEN.

S. vagina, Linn.

Dublin coast, Br. Turt. This species seems chiefly to be met with on the most extensive sandy beaches. A specimen has been given me as from Larne Lough.

S. siliqua, Linn.

Most common of the genus on our coast generally.

S. ensis, Linn.

Dublin coast, common, Br. Turt. Common on sandy coasts. Ballysodare, Mrs. Hancock. Clew and Clifden Bays, W. T. In abundance at Birterbuy Bay, where *S. siliqua* is rare, Dr. Farran.

S. pellucidus, Penn.

Dublin coast, Turt. Catal. Dredged chiefly from about 3 to 6 fathoms, on sandy ground in Belfast and Strangford Loughs, H. and T. Dundalk Bay, Mr. Hyndman. Not a common species.

May 10*th*, 1847.—*Solen pellucidus.*—Two plaice bought in Belfast market to-day had their stomachs wholly filled with broken remains of this shell.

S. legumen, Linn.

Dublin Bay, Br. Turt. (Irish Catalogues.) "Plentiful on the East coast from Cork to Belfast," Brown's Illust. p. 113, 2nd edit. This remark gives quite too extensive an idea of its distribution. Specimens from the extensive sandy coasts of Louth and Dublin only have come under my notice; if the species be found so far North as Down, it must be only on the more southern part of it.

Bantry Bay, Mr. Humphreys, &c.

S. antiquatus, Pult.

Portmarnock, Br. Turt. Red Bay and Larne Lough, Co. Antrim—Strangford Lough, 8—10 fathoms, soft sand, W. T.

Dublin coast, Dr. Ball.

S. strigilatus, Turt.

"Found at Howth, by Mr. Tardy," Turt. C. D. Bantry Bay, Dr. Ball.

Mr. Humphreys, &c. A small specimen procured at Portmarnock by Dr. Lloyd of Malahide.

Genus SAXICAVA.

S. rugosa, Linn.

Common around the coast on the North and East; found from between tide-marks to 20 fathoms, and either burrowing or free. Found sheltering among *Balani* or other excrescences on oysters, clams (*Pecten maximus*), and in the roots of the tangle (*Laminaria digitata*). I have seen large blocks of limestone brought up from some depth in Dublin Bay completely honeycombed externally, apparently by this species, as its shells only were in the apertures.

Jan. 1848. *Saxicava rugosa.*—I find specimens sheltering among broken *Balani* and in the interstices of *Cellepora cervicornis*, both attached to a stone brought up from 40 fathoms off the Gobbins, Co. Antrim.

I find it in the vacant space between the upper portion of *Anomia*, and the oysters to which they are attached.

Family TUBICOLÆ.

Genus GASTROCHÆNA.

G. pholadia, Mont.

South Islands of Arran, off Galway Bay, and Youghal, County Cork, Dr. Ball. Burrowed into limestone in latter locality. Spike Island, Cork Harbour, Mr. Humphreys. Dr. Farran obtained it at Birterbuy Bay, as Sowerby figures it from the Mediterranean, within a caddis-like case, formed by itself of agglutinated sand and shells.

Genus PHOLAS.

P. crispata, Linn.

Portmarnock, Belfast Lough, Brown. Inhabiting indurated clay ("variegated marl"), about low-water mark, Belfast Bay. Youghal, Dr. Ball. Ballycotten, Co. Cork, Miss Ball.

P. papyracea, Turt.

Two specimens of this shell in the Ordnance Museum are labelled "Portrush," North of Ireland. In the fifth volume of the Annals, p. 14, this species was noticed as Irish, with some doubt. Prof. Harvey now writes to me, that "the specimen there alluded to as found in a fishing-boat at Dublin, was procured by Mr. Wm. Todhunter, who believes it to have been dredged on a shelly bank between Howth and Lambay. It certainly was embedded in a sandy conglomerate of shells, &c., which is commonly dredged in this place; the Torbay habitat, if I remember right, is hard red sandstone, and totally different." It is remarked, in reference to the former note—"All the boats of a certain class in this port (Dublin) are called 'Torbay' boats, as they originally came from that place."

"This shell is tolerably abundant in Devonshire, and typifies a peculiar deposit in that country (red marl). Dr. Farran discovered it in a position and formation greatly at variance with its English habitat, having found it in company with three other *Pholadæ*, in a submerged bog, directly under his house at Clonell, near Dungarvan. Both these specimens were submitted to the examination of Prof. Edw. Forbes, during his recent geological visit to Waterford, and elicited from that learned gentleman the remark that the fish was excellent, but that the *Pholas* was a noble and unsurpassed specimen. The discovery of

this mollusc may lead to some interesting geological inferences, and should give a stimulus to the students of Irish Natural History, to endeavour to add by unremitting attention and examination to the Fauna of their country."—*Saunders' News-letter, Oct.* or *Nov.* 1850.

Prof. Forbes writes me that he saw this shell, which is *P. papyracea.* He went to the locality, and convinced himself that it had been found there.

P. striata, Linn.

January 7, 1842, I was favoured with the following communication by Mr. Warren of Dublin:—"I send for your examination a *Pholas* which is new to me, and should like to know if it has been obtained before in Ireland. It was found with others in a piece of water-logged mahogany, near Killala, in the County Sligo, by Richard Glennon, jun." With the letter were a single valve and a perfect specimen, which corresponded well with the descriptions of Montagu and Fleming; the specimens were 4 lines in length, and 7½ in breadth; the plate at the hinge "sub-oval," as described by Montagu.

In *January*, 1844, I was further informed by Mr. Warren, that he had received a specimen of this *Pholas* from Mr. Gaggot, who found several on the coast of Clare. The occurrence of the species in the first instance was, I believe, noticed in the Dublin Penny Magazine.

P. dactylus, Linn.

Howth (Mr. O'Kelly), Brown. Burrowing in variegated marl, from midway between high and low water mark to the latter, near Carrickfergus Castle, and other parts of Belfast Bay. Youghal, Dr. Ball. Ballycotten, Miss Ball.

P. parva, Mont.,

Was procured some years ago off the Long Strand, Belfast Bay, by Dr. J. L. Drummond; subsequently by the Ordnance collectors at Whitehouse Point, in the same Bay.

P. candidus, Linn.

Dublin Bay, rare, Br. With *P. dactylus* in the locality named, W. T. More common than it in Belfast Bay, and much more so than *P. crispata.* *P. candida* is the only *Pholas* included in the lists of western *Molluscs* supplied me, and only as found at Birterbuy Bay, by Dr. Farran, who states that it is common there. Youghal, Dr. Ball.

Genus TEREDO.

T. bipennata, Turt.

From the mast of a vessel cast ashore at Youghal, Dr. Ball. Miltown Malbay, Prof. W. H. Harvey.

T. Norvagica, Spengler.

Previously included in Bryce's Tables, &c., but probably from sub-fossil specimens.

Mr. Getty sent me specimens found in blue clay near Belfast, Oct. 11, 1844. 1847, Kingstown, Dublin Bay, Dr. Ball.

Donaghadee (Co. Down), the animal alive.

Miltown Malbay (Co. Clare), in drift timber.

Belfast, in the bottom of a vessel arrived from the tropics in 1846.

Teredo bipalmulata, Della Chiaie.

I found numbers of this comparatively small species, together with a few of *T. navalis*, Turt., in the timbers of a ship on her return to Belfast from a foreign voyage in 1846. Portions of the timbers were quite honeycombed by *T. malleolus*, so that the vessel had in consequence to undergo great repair. Turton described the species from specimens found in drifted timber at Torbay.

Genus XYLOPHAGA.

Xyl. dorsalis, Turt.

(W. T. Ann. N. H., vol. v. p. 14). In rotten wood at Ringsend, Dublin Bay, Prof. Harvey. In wood from Dublin coast, Mr. Warren, 1847.

CLASS TUNICATA.

THE *Mollusca Tunicata* have in Ireland, as in other countries, engaged very little attention; yet if mere outward beauty be any attraction to the naturalist, where will he behold it more surpassing than in the compound species of this portion of the animal kingdom? Of every hue—arrayed in purple and gold—will he find them even in this "cold and cloudy clime."

Genus ASCIDIA.

A. mentula, Müll.

Belfast Bay; Roundstone Bay, Co. Galway, adhering to a stone between tide-marks, W. T. &c.

A. rustica, Linn.

Commonly investing the larger marine plants—found on shells, stones, &c. This species is much less common on our shores in the adult than in the young state, when, assuming a flattish oval form, and coloured like red cornelian, it is seen beautifully studding our larger *Fuci*.

Lamarck strangely considered that the *A. scabra*, Müll., might be identical with this; they certainly have no relation to each other. Nor can I believe with him, that the *A. patula* and *A. aspersa*, Müll., have any connexion with *A. rustica*.—*Anim. sans Vert.*, t. iii. p. 123.

A. venosa, Müll.

Obtained by dredging in the Loughs of Strangford and Belfast; first distinguished as an Irish species by Dr. J. L. Drummond. It is remarked by Müller to be common about Christiansand.

A. prunum, Müll. (?)

Procured in the same localities as last.

A. conchilega, Müll.

Coasts of Antrim and Down, W. T.

A. parallelogramma, Müll.

I have taken this beautiful species (which is admirably represented in the work of Müller, Z. D. vol. ii. p. 11) on different occasions when dredging in Strangford Lough; it was attached to *Algæ*.

A. canina, Müll.

Strangford Lough; Clew Bay (Co. Mayo), W. T.

A. aspersa, Müll.

Strangford Lough.

A. scabra, Müll.

As last. Possibly not distinct from it.

A. echinata, Linn.

Of this well-marked and pretty species, I obtained an individual parasitic on one of the larger *Ascidia* dredged in Strangford Lough.

A. orbicularis, Müll.

Obtained on *Zostera marina*, in Strangford Lough.

A. mammillaris, Della Chiaie.

Found attached to *Laminaria digitata*, &c., in Belfast and Strangford Loughs. The spinous tubercles in my specimens are not so regularly disposed over the body as represented in Chiaie's work; they are most developed about the orifices.

A. gemina, Templeton.

Mag. Nat. Hist., vii. p. 129. Entrance of Strangford Lough, adhering to submerged rocks.

A. tubulosa, Müll.

One of this species, about twice the size of that represented in the Zoologia Danica, was dredged from pure sand, at about six fathoms' depth, in Ballyhome Bay, Co. Down, in July, 1846 (Mr. Hyndman and W. T). Professor E. Forbes, to whom the species was previously known, says that it is common in the Hebrides.

A. grossularia, Van Beneden.

This species, defined as having the "test corné, presque lisse, de couleur rouge," and being always known by its bright red colour, was found in abundance on oysters at Brightlingsea by its describer. What I consider to be the same species is likewise abundant on shells, stones, and occasionally on *Laminariæ*, dredged from a few fathoms' depth, on the North-east coast of Ireland. It seems to me identical with what is represented in the Zoologia Danica, vol. i. p. 15, t. 15, f. 3, as the *young* state of *Asc. rustica* (previously noticed by me in the Annals, vol. v. p. 94). No allusion, however, is made by Van Beneden to the *A. grossularia* resembling any other *Ascidia:* but I agree with him in considering it a perfectly developed species, and consequently am of opinion that what Müller considered its adult state is another species.

A. virginea, Forb. and Hanl.

I have observed a few individuals of this species on the North-East

coast. I doubt its identity with the *A. virginea*, Müll. Zool. Dan., vol. ii. p. 12, t. 49, f. 4, to which it is referred in the work quoted. I have frequently dredged it in the North of Ireland, but none were taken in Strangford Lough on the 8th and 9th Sept. 1851, when so many other species occurred.

A. communis, Forbes, MSS.

Clew Bay, E. Forbes, &c.

Genus PHALLUSIA.

P. intestinalis, Sav.

Obtained in Strangford Lough.

Genus CYNTHIA.

C. microcosmus, Sav.

North, East, and West of Ireland.

C. claudicans, Sav.

Not uncommon on oysters and other shell-fish taken in the North-East of Ireland. Savigny describes it as common on the oysters brought to Paris.

Genus CLAVELLINA.

C. Lepadiformis, Sav.

Strangford Lough.

Genus DISTOMA.

D. rubrum, Sav.

On *Laminaria digitata* dredged in Belfast Bay, by Edm. Getty, Esq., and kindly sent me.

This species was communicated by Leach to Savigny, who notices it simply as inhabiting the European seas. My specimens were not of so lively a colour as represented in Savigny's work.

D. variolosum, Gaërt.

A *Distoma*, apparently from description (I have not seen any figure) of this species, has occurred to me, investing *Fucus serratus* in Belfast Bay; the colour was always whitish-yellow. Gaërtner announced the *D. variolosum* to be found enveloping *Fucus palmatus*, on the coast of England.

Genus APLIDIUM.

A. fallax, Johnst.

Found by me on the North-East coast, several years since.

Genus SIDNYUM.

S. turbinatum, Sav.

I once procured this in Strangford Lough; and by Dr. J. L. Drummond it has since been found in Belfast Bay.

Genus AMOROUCIUM.

A. proliferum, Edw.

Belfast Bay, W. T.

A. albicans, Edw.

Dredged from several fathoms in Belfast Bay (1839), and on the Galway coast (1840), W. T.

Mr. M'Calla mentioned to me that he had collected this species on the Irish coast.

Genus LEPTOCLINUM.

L. gelatinosum, Edw.

On the roots of *Laminariæ*, in Belfast Bay, W. T.

L. maculosum, Edw.

On the roots of *Laminariæ* in Belfast Bay and North of Ireland generally;—our most common *Leptoclinum*, W. T.

L. asperum, Edw.

With last.

L. aureum, Edw.

Dredged in Strangford Lough, Mr. Hyndman and W. T.

Genus BOTRYLLUS.

B. Leachii, Sav.

North-East of Ireland, occasionally investing the roots of *Laminaria digitata*, &c.; when dried, it has somewhat the appearance of a sponge. This species was sent by Leach to Savigny, who marks it with doubt as from the English coast. On the shores of Naples it has been found by Della Chiaie, as above cited.

B. Schlosseri, Linn.

I have occasionally obtained this on *Algæ* in the Loughs of Strangford and Belfast, and have found it attached to stones at the island of Lambay, Dublin coast.

B. polycyclus, Sav.

This very beautiful species, which is admirably described by Savigny, I have found much more common in the North of Ireland than the *B. Schlosseri;* it occurs chiefly on the leaves of *Laminaria digitata*. The Adriatic Sea and La Manche are the localities whence Savigny procured it. What Della Chiaie figures as a variety of this species, tab. 36, fig. 9, has occurred to me as commonly as the ordinary state.

B. gemmeus, Sav.

Adhering to *Fuci* dredged in Belfast Bay, by Edmund Getty, Esq.

B. bivittatus, Edw.

With last.

B. violaceus, Edw.

On *Fuci*, Belfast Bay, W. T.

B. smaragdus, Edw.

A species taken at Hollywood, Belfast Bay, by Dr. J. L. Drummond, in the summer of 1846, of which he made a drawing and noted the colour, seems to be the *B. smaragdus*. The notes are not in sufficient detail to insure certainty.

Genus BOTRYLLOIDES.

B. albicans, Edw.

July 16th, 1846.—I found this species attached to the under side of a stone in a pool between tide-marks at Springvale, County of Down. It was likewise attached to *Fuci* (*F. vesiculosus*, &c.) growing in the rock-pools, and was in much smaller masses than the following species; generally, but one system of individuals existed in each mass. On the small branches of *Fuci* to which it was attached there was not room for more; nor was there indeed on the broadest portion of the main stem, whence the leading branches of the plant issued:—the latter is its favourite position. The specimens agreed in all respects with the descriptions and figures in Edwards' work.

B. rotifera, Edw.,

Was attached to the under side of the same stone with the last, and covered several square inches of its surface. I mark it with doubt on account merely of some little difference in colour. The "consistance gélatineuse" was rather hyaline than "jaunâtre;" the individual forms were more of a uniform red than in Edwards' figure, and were each as brightly coloured as in *B. rubrum*, Edw., and of the hue that it is represented to be. The individuals being arranged in a scattered manner, and not thrown into masses as in *B. rubrum*, was a striking character.

B. rubrum, M.-Edw. Mem. Ascid. Comp., p. 88, pl. 6, f. 3; Forb. and Hanl. Brit. Moll., vol. i. p. 24.

From the middle of February last, and during spring, this handsome species was commonly thrown ashore at Cultra, Belfast Bay, its bright colour often rendering it quite a conspicuous object among the ordinary rejectamenta of the waves. Its attachment to plants which grow within a few fathoms of depth denoted its being an inhabitant of comparatively shallow water. The largest mass which came under my notice (brought to me by Mr. Wm. H. Patterson) was $4\frac{3}{4}$ inches in length, $1\frac{1}{2}$ inch in breadth, and $\frac{1}{8}$ inch in thickness at the thickest portion; weight $\frac{3}{4}$ of an ounce. It was adherent to several of the narrow leaves of *Zostera marina*, which are about $\frac{1}{4}$ of an inch in breadth, and to these only. The gelatinous mass was reddish-brown; the systems of animals of a brilliant orange-red. It agreed in all respects with the description and figure of M.-Edwards. The variety in the ramification of the systems of animals through so large a mass was extremely beautiful, resembling an elegant pattern done in lace-work.

A plant of *Halidrys siliquosa* dredged from five fathoms in Belfast Bay on the 3rd of April (kindly sent to me by Edmund Getty, Esq.) contained several masses of *Botrylloides*. They were all of a very pale greyish gelatinous colour; the systems of animals in some, more irregularly dis-

posed than in *B. rotifera*, as figured by M.-Edwards, were whitish; others disposed like *B. rotifera* were buff; others again disposed precisely like *B. rubrum* were orange. Some tadpole-like larvæ as figured by M.-Edwards (pl. 4) were observed.

B. rubrum has hitherto been recorded as found on the coast of Normandy (M.-Edwards) and at Falmouth (Alder) only.

Genus DIDEMNUM.

D. gelatinosum, Edw.

Adherent to *Serpula tubularia* dredged in Strangford Lough, Oct., 1839, &c., W. T. Dr. Scouler has met with it on the Irish coast.

A species apparently of this genus may not uncommonly be found investing the stems of *Halidrys siliquosa*. It is of a pale grey colour, and may be said to give the plant the appearance of being besmeared with bird-lime.

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* At the Glasgow meeting of the British Association for Science in 1840, I brought forward a series of Dredging Papers, the first of which had been filled up by my lamented friend, the late Professor Edw. Forbes, on the 11th of July, 1840, on which day he had visited me at Bangor, County Down, and joined in a little dredging excursion, Mr. Hyndman and Mr. Thompson being our companions. Some additional papers were filled up the succeeding year, and all were placed in the hands of Prof. Forbes, who on more than one occasion publicly referred to them.

Under these circumstances it may seem strange that no mention is made of my name in connexion with the list of Mollusca found in Belfast Bay, as now given; nor in that of other classes belonging to the *Articulata* and *Radiata*. This may be explained by the fact, that when Prof. Forbes, in 1850, had completed one portion of his Report, he handed my Dredging Papers to Mr. Thompson, by whom they were retained, in order to be used when the time for preparing for press that portion of the Natural History of Ireland should arrive. His premature death prevented that intention from being fulfilled; and those Dredging Papers, still unused, were found among his Natural History MSS. and handed to me along with them.

All the species which I had enumerated had been recorded by Mr. Hyndman, Mr. Thompson, or other friends; there seemed therefore no sufficient reason for interpolating my name in the MSS.

Robert Patterson.

INSECTA.

In a note appended to his Report, in 1843, Mr. Thompson gives the numbers of Irish insects then known, as communicated to him by his friend A. H. Haliday, Esq. Had Mr. Thompson's life been spared until the present volume was approaching completion, he would doubtless have applied once more to the same distinguished entomologist for information brought up to the present time. We did not hesitate, therefore, to ask Mr. Haliday for such notes as would enable us to give the number of species of the several orders so far as they have been at present investigated. Our application was responded to with the utmost kindness and promptitude. The annexed list has thus been supplied.—Ed.

Coleoptera.

Stylopidæ	2	Heteroceridæ	3
Mordellidæ	4	Byrrhidæ	3
Cantharidæ	2	Dermestidæ	4
Anthicidæ	1	Trixagidæ	1
Salpingidæ	3	Mycetophagidæ	1
Œdemeridæ	3	Cryptophagidæ	23
Lagridæ	1	Colydidæ	1
Pyrochroidæ	1	Cucujidæ	1
Melandryidæ	3	Nitidulidæ	26
Tenebrionidæ	10	Phalacridæ	2
Chrysomelidæ	81	Engidæ	2
Donacidæ	10	Lathrididæ	13
Cerambycidæ	13	Endomychidæ	2
Curculionidæ	149	Coccinellidæ	15
Hylesinidæ	6	Corylophidæ	4
Bostrichidæ	1	Clambidæ	3
Cetonidæ	1	Anisotomidæ	8
Rutelidæ	1	Silphidæ	23
Melolonthidæ	4	Scydmænidæ	5
Geotrupidæ	5	Pselaphidæ	9
Copridæ	2	Staphylinidæ	91
Aphodidæ	22	Histridæ	10
Trogidæ	1	Hydrophilidæ	45
Lucanidæ	1	Elmidæ	5
Ptinidæ	10	Gyrinidæ	6
Cleridæ	3	Dytiscidæ	65
Melyridæ	3	Carabidæ	153
Lampyridæ	19	Cicindelidæ	1
Cyphonidæ	7	Trichopterygidæ	16
Dascillidæ	1		
Elateridæ	17		929
Buprestidæ	1		

NEUROPTERA.

Forficulidæ	2	Libellulidæ	7
Locustidæ	8	Aeschnidæ	3
Gryllidæ	1	Agrionidæ	15
Achetidæ	1	Phlæothripidæ	6
Blattidæ	1	Thripidæ	34
Lepismidæ	4	Semblidæ	1
Poduridæ	22	Hemerobidæ	18
Liotheidæ	9	Coniopterygidæ	2
Philopteridæ	47	Phryganidæ	35*
Psocidæ	10		243
Perlidæ	10		
Ephemeridæ	7*		

LEPIDOPTERA.

Pterophoridæ	7	Bombycidæ	51
Crambidæ	13	Hepialidæ	6
Tineidæ	116	Sphingidæ	21
Tortricidæ	86	Hesperidæ	2
Noctuidæ	142	Papilionidæ	36
Pyralidæ	26		645
Phalænidæ	139		

HYMENOPTERA.

Tenthredinidæ	111	Dryinidæ	17
Siricidæ	1	Bethyllidæ	1
Ichneumonidæ	223*	Pompilidæ	8
Braconidæ	325	Sphegidæ	1
Fœnidæ	1	Crabronidæ	18
Proctotrupidæ	*43	Eumenidæ	2
Scelionidæ	81	Vespidæ	3
Ceraphronidæ	17	Apidæ	45
Cyniphidæ	39	Formicidæ	12
Chalcidæ	263		1247
Mymaridæ	35		
Chrysidæ	1		

DIPTERA.

Hippoboscidæ	4	Tabanidæ	4
Phoridæ	17	Stratiomidæ	22
Œstridæ	3	Rhyphidæ	3
Muscidæ	494*	Heteroclitæ	6
Conopidæ	3	Tipulidæ	73
Syrphidæ	80	Phlebotomidæ	16
Pipunculidæ	8	Culicidæ	11
Platypezidæ	7	Chironomidæ	60*
Lonchopteridæ	4	Simulidæ	4
Dolichopidæ	105	Bibionidæ	25
Empidæ	80	Cecidomyzidæ	15
Scenopinidæ	2	Mycetophilidæ	52
Bombylidæ	7	Pulicidæ	5
Asilidæ	3		1130
Leptidæ	7		

HEMIPTERA.

Coccidæ	10	Reduvidæ	3
Aphidæ	53*	Capsidæ	34
Psyllidæ	30	Coreidæ	4
Fulgoridæ	6	Anisoscelidæ	3
Cercopidæ	41	Lygeidæ	10
Notonectidæ	10	Pentatomidæ	9
Nepidæ	1	Scutelleridæ	1
Gerridæ	8	Pediculidæ	6
Hebridæ	1		
Cimicidæ	9		246*
Tingidæ	7		

SUMMARY.

Coleoptera	929
Neuroptera	243
Lepidoptera	645
Hymenoptera	1247
Diptera	1130
Hemiptera	246
	4440

named in our collections, but subject, no doubt, to much correction as to names.

The numbers followed by * denote that the Irish species have not yet been carefully examined, and that the number far exceeds that which is given; the * before the number, that they are much more numerous, but that there are no names yet for many of them.

The families are not in very good order, and many are kept which would be better sunk in neighbouring families; but the enumeration helps to show the local distribution of groups the better.—A. H. H.

CRUSTACEA.

1st LEGION, PODOPHTHALMATA.

ORDER DECAPODA.

1st Section, Brachyura.

Genus Stenorynchus.

S. phalangium, Leach.

This species has already been recorded by Templeton as "not uncommon on the Irish coast," and by Mr. J. V. Thompson as "very abundant in the deep water of the harbour of Cove."—*Ent. Mag.* vol. iii. p. 371.

It has occurred very commonly to my scientific friends and myself when dredging in the Loughs of Strangford and Belfast, 6 to 23 fathoms; and to Dr. Ball at the South Islands of Arran,* as well as at Youghal and Dublin. The motions of this crab are slow, though its light body borne on such long legs would be popularly believed to indicate considerable powers of locomotion. The editor of the octavo edition of Pennant's British Zoology (1812) remarks, that this crab "invests itself occasionally in leaves of *fuci* to insnare its prey:" and Dr. Leach states that "it has been observed by Dr. M'Culloch to be sometimes covered by fragments of a species of the Linnæan genus *Fucus*, which are attached to its body and legs." The first statement seems to me fanciful. The presence of fragments of *fuci*, &c., I should rather attribute to the spinous body, and the bristly arms and legs of great length intercepting adventitious substances, which in floating through the water come in contact with them, and (as Dr. Ball reminds me) are further retained there by a viscid slime covering the animal. Many marine productions, however, both of a vegetable and animal nature, have their birth and grow to beauty on the shell of this as well as other species of our native Crustacea—corallines, sponges,

* On different parts of the western coast—Westport, Clifden, and Killeries—it was dredged by us in 1840.

† I have recently had several specimens of the *S. phalangium* in confinement; some of those when captured were ornamented with portions of zoophytes or algæ. I have had the opportunity of observing the process of decoration adopted, and it appears to be a daily operation in the marine vivaria. In the Zoological Gardens, Phœnix Park, some of these crabs were kept in a tank in which the *Enteromorpha intestinalis* was cultivated; in this they are to be observed tearing off with their larger claws small portions of the *Alga*: these portions they appear to masticate at one end with their jaws for a little time, and then attach to some one or other leg by means of the pincer claws; thus the viscid attaching matter would seem to come from the jaws of the animal. A similar proceeding has been observed when the crab was confined with *Ulva latissima*.—*R. B., Dec.* 16, 1854.

zoophytes, algæ, &c., may thus be found. *Balani* occasionally cover the entire upper surface of the body of the crab.

Aug. 22, 1840.—On opening a thornback (*Raia clavata*), about 20 inches in length, caught in Belfast Bay, I found its stomach entirely filled with *S. phalangium*.

S. tenuirostris, Leach.

On examining some fine *Stenorhynchi* dredged in Belfast Bay, from a depth of 20 to 23 fathoms (shelly sand), in Oct., 1846, by Mr. Hyndman, I found that like specimens obtained there, but from a much less depth, some years before, had more characters in common with this species than with *S. phalangium*. The rostrum, though longer than in the latter,—3 lines in length in a specimen whose carapace from its base to the hinder extremity is 10 lines,—is not of the extreme length of that of *S. tenuirostris*:—instead of being "longer than the peduncle of the external antennæ," it is not so long. But "the series of minute spines on the inner part of the arm, the body altogether more elongated, and the spines more acute," than in *S. phalangium*, mark my specimens as *S. tenuirostris*.

The preceding notes were made on a comparison of these examples with the descriptions of Leach and Bell. Having subsequently taken specimens to London and compared them with those in the British Museum described by Leach, the result was the same. I therefore look upon *S. tenuirostris* and *S. phalangium*—although extreme forms are very distinctly marked—to be in reality but one species. It may be added, that in one of the two Irish examples of what I have called *S. tenuirostris* taken to the British Museum, the wrist has the form attributed to that species, and in the other, that attributed to *S. phalangium*. Both of these individuals were added to that collection. The *Sten. Egyptius*, Edw., it need hardly be remarked, is quite different from those under consideration; it is alluded to in consequence of being the only other species of the genus.

The questions occur:—is the *S. tenuirostris* a deep-water, a local, or a geographical variety? The following remarks, though all that can be given, have not any very definite bearing on these points. Leach mentions it as a very common inhabitant of all the deep water off the coast of South Devon. Couch in his Cornish Fauna, part 1, p. 64, states that it is "common at the depth of from 2 to 20 fathoms." M. Edwards says of *S. longirostris*, Fabr. (sp.), which he makes synonymous with *S. tenuirostris*, Leach,—but Mr. Bell thinks that they may be distinct,—that it inhabits the Manche and the Mediterranean.

S. phalangium is noted by Leach as "very common in the mouths of rivers and in estuaries." Couch has never met with it on the coast of Cornwall. M. Edwards notes it as very common on the coasts of the Manche and the Ocean.

Oct. 10th, 1851.—*Stenorhynchus phalangium*.—I found one cast ashore to-day on the beach North of Newcastle.

Genus ACHÆUS.

A. Cranchii, Leach.

In the collection of Crustacea formed by Mr. J. V. Thompson, and now in the possession of the Royal Dublin Society, is a native specimen of this crab, which, we may presume, was obtained on the southern coast. Cove, Cork Fauna.

Oct., 1834, and on a subsequent occasion we obtained several individuals in the same locality. It has been dredged in Belfast Bay by Dr. J. L. Drummond. Dr. Ball once found this species cast ashore in numbers on the Dublin coast after a great storm; and in his collection are fine specimens from Roundstone, on the western coast.

Capt. Beechey, R. N., brought up a crab of this species alive in the dredge from a depth of 50 fathoms off the Mull of Galloway.

On examining other specimens in my collection, and finding great diversity as to the isolation and approximation of the tubercles so as to form shields in the different individuals, I became certain that the *E. aspera* and *E. scutellata* are but one species, the latter being a state of the former with the tubercles drawn together so as to form shield-like patterns. The shields in all the specimens examined, except the first-mentioned, show that they are formed by the junction of the tubercles: in it however no trace of the separate tubercles is visible, but instead, the five on either side the central one on the cardiac region are all fused together. Those forming the smaller shield anterior to it are likewise fused together so as to leave no trace of the number of tubercles forming it.

Genus XANTHO.

X. florida, Leach,

Seems to be a local species. It is recorded as Irish in Mr. J. V. Thompson's catalogue. In the Ordnance collection are specimens from three localities on the Antrim coast—Carnlough, Larne, and Carrickfergus; and in Dr. Ball's cabinet there is an example from Dublin Bay. In July, 1840, this species was found commonly by Professor Forbes and myself under stones between tide-marks at Lahinch, County Clare:—the entire claws of these specimens (all under half adult size) are of a pale-brown colour, but very different in shade from any part of the body of the animal: in Leach's Malacostraca the claws are described and figured as black, but a variety stated to be rare is said to have "the tops of the claws of the same colour with the other parts of the animal."

Abundant under stones on the beach, Tory Island, Mr. Hyndman.

X. rivulosa, Risso.

A fine example of a crab so named, and which is an addition to the British Fauna, is in the Ordnance collection—it was taken at Portrush, County of Antrim, in July, 1839. Col. Portlock informs me that having been at once identified as the *X. rivulosa*, more specimens were assiduously sought for in the locality, but in vain. I fully agree with him in considering it the *X. riculosa* as described by M. Edwards. It seems to me a well-marked species. It is said to inhabit the Mediterranean and the western coast of France.

Genus CANCER.

C. Pagurus, Leach.

This, the common edible crab, is taken on all quarters of the Irish coast, and is held in good estimation for the table. It is the only species brought on sale to Belfast market. In January, 1836, a specimen weighing 9½ lbs. was taken in Strangford Lough, and in Aug., 1841, one of 9 lbs. was obtained in Belfast Bay: these were of extraordinary magnitude for the North of Ireland to produce, although not larger than what are commonly to be seen in the Londo[illegible]. Edwards mentions this

stones between tide-marks at Lahinch, on the coast of Clare. In Mr. Hyndman's cabinet are two crabs of this species with oysters attached to their backs. The oyster (*Ostrea edulis*) on the larger crab is 3 inches in length, and five or six years old, and is covered with many large *Balani*. The "shell" or carapace of the crab is but $2\frac{1}{4}$ inches in length, and hence it must, Atlas-like, have borne a world of weight upon its shoulders. The presence of this oyster affords interesting evidence that the *Hyas* lived several years after attaining its full growth. Both crabs and oysters, though dead, were brought to Mr. Hyndman in a fresh state. The hairs on the body and legs of specimens in my collection are longer in the small than in the large individuals. On the North-East coast of Ireland the *H. araneus* is very much preyed on by the cod-fish.

In January, 1840, I saw specimens of this crab of very large size on the coast near Edinburgh: the carapace of one which I measured was 3 inches in length, and the extent from the extremities of the first pair of legs, 11 inches.

H. coarctatus, Leach.

This species is set down as Irish in Mr. J. V. Thompson's catalogue, his specimens being most probably from the southern coast. In Dr. Ball's collection are examples from Youghal, and some dredged by him in Dalkey Sound, near Dublin. In the Loughs of Belfast and Strangford we take it very commonly with the dredge. Donaghadee, in 8—10 fathoms, by Dr. Drummond. I have seen an example from the Giant's Causeway—thus from the North to the South of Ireland the species prevails.

Dr. J. L. Drummond has found numbers of these crabs in the stomachs of cod-fish brought to Belfast market. The largest example I have seen was found in the mouth of a haddock taken at Killough, County Down. Its carapace is 2 inches 2 lines in length; each arm from base to point of claw 3 inches $7\frac{1}{2}$ lines. The body, legs, and arms of my specimens of *H. coarctatus* are very much invested with zoophytes, sponges, and algæ.

Examples of this crab have been sent me from Portpatrick by Capt. Fayrer, R. N.; and I have myself obtained it on the opposite or eastern coast, at Newhaven, near Edinburgh. Captain Beechey, R. N., brought up four examples of this species alive in the dredge from a depth of about 140 fathoms off the Mull of Galloway.

Genus MAIA.

Maia Squinado, Latr.,

Inhabits the southern coast. Native specimens of this crab are in Mr. J. V. Thompson's collection. Dr. Ball informs me that it is taken not unfrequently with lobsters about Youghal, where it is called horrid-crab; it is not brought to market, but is sometimes eaten by the fishermen—the carapace of a specimen from that locality in this gentleman's collection is 7 inches in length, and others are little inferior to it.

One of these crabs was brought to me at Ventnor, Isle of Wight, where it was taken in a crab-pot at the same time with a *Galathea strigosa*.

Genus EURYNOME.

E. aspera, Leach.

Marked as Irish in Mr. J. V. Thompson's collection. It is rather a rare species, and an inhabitant of deep water. In Strangford Lough a single specimen was taken in the dredge by Mr. Hyndman and myself in

Oct., 1834, and on a subsequent occasion we obtained several individuals in the same locality. It has been dredged in Belfast Bay by Dr. J. L. Drummond. Dr. Ball once found this species cast ashore in numbers on the Dublin coast after a great storm; and in his collection are fine specimens from Roundstone, on the western coast.

Capt. Beechey, R. N., brought up a crab of this species alive in the dredge from a depth of 50 fathoms off the Mull of Galloway.

On examining other specimens in my collection, and finding great diversity as to the isolation and approximation of the tubercles so as to form shields in the different individuals, I became certain that the *E. aspera* and *E. scutellata* are but one species, the latter being a state of the former with the tubercles drawn together so as to form shield-like patterns. The shields in all the specimens examined, except the first-mentioned, show that they are formed by the junction of the tubercles: in it however no trace of the separate tubercles is visible, but instead, the five on either side the central one on the cardiac region are all fused together. Those forming the smaller shield anterior to it are likewise fused together so as to leave no trace of the number of tubercles forming it.

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species as sometimes exceeding 5 lbs. in weight on the coast of France, t. i. p. 414. The ordinary method of taking these crabs on the coast of Ireland is the same as that resorted to in England—"wicker-baskets in the form of a wire mouse-trap." But Mr. Hyndman has seen them sought after and captured at Donaghadee by persons thrusting a piece of iron hooked at the end into the crevices of rocks, the ordinary retreat of the crabs at low-water: a similar practice, according to Dr. Ball, is pursued in the South. In spring and summer they are considered to be in season at Belfast and Dublin,*—between Christmas and Easter is the period mentioned by Leach. As this is not a littoral species it may be worth remarking, that several very small individuals (their carapace an inch in breadth) were found by Mr. E. Forbes and myself in the month of July, frequenting the shore at Lahinch between tide-marks.

Genus PILUMNUS.

P. hirtellus, Leach.

This appears to be a widely-distributed species, occurring in small numbers where found. It is enumerated among the native Crustacea in Mr. J. V. Thompson's catalogue; and in the first vol. of the Ordnance Survey is noticed as obtained at Carnlough, County of Antrim. In the course of a day's dredging in the Loughs of Strangford and Belfast, one or two individuals of this species have generally been procured by us. Dr. Ball has taken it on the Dublin coast by dredging, and has likewise found it inhabiting the beach between tide-marks at Portmarnock—by Prof. Forbes and myself it was similarly found at Lahinch. Specimens from Youghal are in Dr. Ball's collection, and from Courtmasherry Harbour—also in the County of Cork, in Professor Allman's. The figures of this species given by Leach and Pennant are good and characteristic: Desmarest's figure (Consid. Crust., pl. 11, f. 1) is not so.

Genus PIRIMELA.

P. denticulata, Leach.

Of this small and handsomely sculptured crab I have seen but two Irish examples. The first was found amongst a number of species of various kinds collected on the coast of Antrim and Down by Dr. J. L. Drummond, and kindly submitted to my investigation. The other was obtained alive by Prof. Forbes and myself between tide-marks at Lahinch, on the coast of Clare.

Dublin, Dr. Coulter.

Genus CARCINUS.

C. Mænas, Leach.

This species is common around the coast of Ireland, and is popularly known by the name of *partęn* in the North, the *crab*, par excellence, being the *Cancer pagurus*.† On gravelly, sandy, and muddy shores I have remarked

* Rutty, writing seventy years ago, remarks—"The greatest quantity of crabs and lobsters supplying Dublin comes from the Isle of Man; but the best are those from Lambay, Howth, and Skerries; for the former by longer carriage and agitation fret and waste themselves, and thereby become much worse food. They are also brought from the Saltee Islands, about 80 miles from Dublin, by the fishermen of Bullock, Dunleary, and Howth."—*Nat. Hist. Dublin*, vol. i. p. 374.

† This species being distinguished as *the* crab, I should hope with Mr. T. Bell (Zool. Trans.) that it were considered the type of the genus *Cancer*.

this species to be about equally common. Dr. Ball states that it inhabits holes in the hard mud, but whether made by itself he cannot say. (The *Gonoplax bispinosa* is said by Mr. Cranch "to live in excavations formed in the hardened mud, and that their habitations, at the extremities of which they live, are open at each end." Leach, Mal. Pod. Brit.) In the ordinary rejectamenta of the tide it occurs much more frequently than any other species, and generally in a young state. The carapace of the largest example in my collection, from Belfast Bay, is 3¼ inches in breadth and 2½ in length. Pennant and Leach state that this crab is sent in quantities to London, where it is eaten by the poor; and M. Edwards observes that it is used in like manner in Paris. In other large towns also I have remarked it on sale, but in Belfast the *Cancer pagurus*, as has been already remarked, is the only species of crab used as an article of food. The *Carcinus Mænas* is much in request by juvenile anglers and fishermen for bait. I have seen it so used by persons fishing for flounders (*Platessa flesus*) in the river Bann, near Portstewart. By Dr. J. L. Drummond I am informed that its liver is the chief bait used by boys at Larne in fishing for the young of the *Merlangus carbonarius*, called there *pickock*. Dr. Ball states that when these crabs are about to change their shells, or have recently done so, they are sought for under the sea-weeds at low-tide by the fishermen at Youghal, chiefly as bait for flat-fish, and are superior to anything that can be used—in this soft state they are here called *pil-crabs* (qu. peeled-crabs).

A specimen of the great northern diver, shot in Dublin Bay, was brought to me; in its crop I found three very large specimens of *C. Mænas*, deprived of their legs. I recently found in same locality a specimen of *Actinia gemmacea* in the act of swallowing a well-grown specimen of this crab, thus proving that the race has more enemies than I have seen recorded.—*R. B.*, 16 *Dec.*, 1854.

At the quays of Youghal these crabs are caught in great numbers simply with fish-entrails tied to a string. They prove such an annoyance to boys fishing at Belfast quay by consuming their bait, that all of them caught in the act are instantly trampled to death, and hence may have arisen the proverb of "crab's allowance." Dr. Ball was once witness to the body of a person drowned when bathing at Youghal, being taken out of the water an hour and a half after his disappearance, when several of these crabs were engaged eating the eye-lids of the corpse.

July 20, 1851.—*Carcinus Mænas* of all sizes up to 3 inches in breadth, lying dead on the beach at Newcastle, Co. Down.

M. Edwards remarks that the name of "Crâbes enragés" is applied to this species on the coast of Normandy; and it is sufficiently appropriate, for when arrested in their rapid progress over the beach—and well (as remarked by that author) they can run—they instantly throw up their claws in anger to attack the intruder, and if not guarded against, will give him *feeling* evidence of their displeasure. M. Edwards too observes, that they have been kept alive for a long time out of the water, but he would perhaps hardly be prepared to expect that they are so tenacious of life as shown in the following instance, communicated by Mr. R. Patterson:—"I remember above twenty years ago spending one of my school vacations at Holywood, Belfast Bay, and on one occasion was so annoyed by the common crabs (*C. Mænas*) eating the bait from my fishing-hook, that at length I took a number of the crabs and by way of retaliation buried them alive in the garden. Some time after, but how long I cannot now remember, I was tempted to dig them up to see what kind of a state they were then

in, when to my surprise they were not only living, but able to move about as actively as ever. Wishing to verify the remembrance of this boyish prank, I took some of the crabs in the summer of 1837, threw a piece of sea-weed on them, and buried them to the depth of twelve or fourteen inches, the soil above them, being closely beaten down. When leaving the country seventeen days afterwards I found them living, and one individual was so brisk that he caught the spade in his claws. I have had no opportunity of ascertaining what is the limit of the time they would live under such circumstances."

When at the Isle of Wight in the summer of 1841, I remarked this to be the most common crab on all parts of the coast. At Ventnor it was flung from the crab-pots as useless.

I don't know whether the *C. Mænas* be found in the Adriatic Sea, but a crab which I saw under one of the bridges at Venice seemed to be this species. I remarked several crab-pots set at the sea or eastern entrance of one of the canals here where the bottom is oozy.

Genus PORTUMNUS.

P. variegatus, Leach,

Is occasionally found thrown ashore on extensive sandy beaches. I have seen examples from Macgilligan and Portrush on the northern, and Portmarnock on the eastern coast. Leach mentions this as "the most common species of the Malacostracous animals that inhabit our coasts," and that "it is found thrown on all the sandy shores of Great Britain in great abundance, especially during storms." On the Irish coast it is quite a local species. In the course of dredging in the open sea off Down, in the Loughs of Strangford and Belfast, a single example only of this species has occurred either to my friends or to myself. In dredging on the Connaught coast, and about Dublin Bay on the opposite side of the island, I never saw this species brought up—some of the localities dredged over were sandy and off extensive beaches of the same nature. After severe storms chiefly, we find it cast ashore upon the sand. *Corystes Cassivelaunus* is much more generally distributed on the sandy coasts of Ireland than *Portumnus variegatus*.

July 25, 1837.—*Portumnus variegatus* (*Sept.* a second specimen obtained), Newcastle, Co. Down.

Dec., 1851.—I received a specimen from Bartra Island, Killala Bay, from Mr. Robert Warren, jun.

Genus PORTUNUS.

P. puber, Leach.

Of this species, the velvet crab of British authors—noticed by Templeton and J. V. Thompson as Irish—I have seen examples from all quarters of the coast. Dr. J. L. Drummond informs me that it is taken commonly at Bangor (Co. Down) by boys, who find it lurking under large stones in rocky pools at low-water. Between tide-marks we found it common at Lahinch. Dr. Ball states that at Youghal, where the species grows to a large size, and is known by the name of Kerry Witch, it is caught along with *Carcinus Mænas*, with fish-entrails used as bait.

Under stones on beach, Tory Island, Mr. Hyndman.

P. Depurator, Leach.

From Templeton noting this crab merely as "found on the sands at Dunfanaghy, Co. Donegal, July 13, 1815," and from the specimen named

P. Depurator in Mr. J. V. Thompson's collection (now in the College of Surgeons, Dublin) being in reality *P. lividus*, it might be supposed that the species is not common. We have however dredged it in Strangford Lough, in the open sea off Down, and on the Connaught coast. During some weeks spent at Bangor, near the entrance of Belfast Bay, in the autumn of 1835, I found this to be the most common species of crab thrown by the waves upon the beach—*Carc. Mænas* being the common one found *alive* between tide-marks. Dr. Ball mentions that the *P. Depurator* is local, but abundant where it does occur about Youghal.

Recently taken at Dublin.—*R. B.*, 1854.

P. lividus, Leach,

Is not common. Templeton mentions it as found by him "on the shore at Dunfanaghy." We have dredged it on more than one occasion in Belfast Bay, and have obtained it on the beach at Carnlough, County of Antrim. In Dr. Ball's collection are several specimens which were dredged in Dublin Bay. Leach mentions his having seen but two examples of this species.

Newcastle, Co. Down, July, 1851.—*Portunus lividus*, one imperfect, but sufficiently perfect for positive identification on comparison with Bell's Crustacea, found in a fishing-boat. *July* 23*rd*, 1851.—A perfect *P. lividus* was the only crab I found on the beach, in addition to the above two specimens.

P. corrugatus, Leach.

The only specimens of this species which I have seen are some fine examples from Larne and Carrickfergus in the Ordnance collection, and a single specimen obtained on the Dublin coast by Dr. Ball. Mr. J. V. Thompson notices *P. corrugatus* as inhabiting the harbour of Cove, but those so named in his collection are the wrinkled variety of *P. Depurator*.

Dredged in 20 fathoms, Belfast Bay, Mr. Hyndman.

P. pusillus, Leach,

Generally inhabits deep water. It is ordinarily taken by us when dredging in the Loughs of Strangford and Belfast; at the Killeries in Connemara it has similarly occurred, as well as in Dublin Bay. In the South, too, it has been taken by Mr. J. V. Thompson in the harbour of Cove—see note on *P. marmoreus*, p. 282. I have several times found it in the stomachs of fishes; in one instance in a *Trigla Gurnardus*, taken in the open sea off Down.

At Compton, in the Isle of Wight, I procured several of this species thrown by the waves upon the beach.

P. arcuatus, Leach,

Has been taken occasionally by us when dredging in deep water in the Loughs of Strangford and Belfast; and has been found cast ashore at Portmarnock by Dr. Ball. It was procured by our party in the summer of 1840, when dredging in Killery and Roundstone Bays on the western coast. Specimens are in Mr. J. V. Thompson's collection, and, it may be presumed, from Cork. All the examples of this species which have occurred to myself were taken in the dredge, excepting on one occasion (Oct. 1) at Killinchy, on the shore of Strangford Lough, when, looking to the refuse in a number of small boats which had been employed the night

before in herring fishing, I found in every one of them several of these crabs which had been brought up in the nets, and not one of any other species.

Leach remarks that "*P. arcuatus* differs from *P. emarginatus* only in the form of the anterior part of the shell, and may be no more than a variety of that species." M. Edwards considers them the same. All the specimens preserved (about thirty) from the different localities mentioned,—and there is about an equal number of both sexes ranging from a very small size up to that of Leach's figure of *P. emarginatus*,—have the anterior part of the shell corresponding to that of *P. arcuatus*, or in other words, arched:—"fronte arcuato integro" is Leach's description of it.

Genus POLYBIUS.

P. Henslowii, Leach.

A crab of this species was obtained at Crook Haven, County Cork, in the month of August by Dr. Allman, who kindly sent it to me. It was remarked at the same time by its captor that the species appears to be "eminently natatory," and that "the one taken was swimming with great ease near the surface of the water among shoals of *Acalephæ*." It would appear, from the general work of Milne Edwards on the Crustacea, that this is the only species of its genus known. It was described by Leach from specimens taken on the coast of Devonshire, and is given by M. Edwards as one of the species of La Manche, these being the only localities noticed for it in the two works.

Genus PINNOTHERES.

P. Pisum, Leach.

Templeton has noticed this species as "dredged up in Belfast Lough." It is commonly found in *Modiolus vulgaris* on the Irish coast, where it is of much more frequent occurrence than in the locality in which Dr. Leach endeavoured to ascertain the number found in a certain quantity of mussels. In the article Crustaceology (Edin. Ency.) it is remarked that—"in one hundred of *Mytilus modiolus*, Dr. Leach found three of this species." On opening eighteen specimens of the *Modiolus vulgaris* of various size — the produce of dredging off Bangor (Co. Down) in October, 1835—I found fourteen individuals of *P. Pisum*, all females: in one shell only two of the crabs occurred. I have subsequently opened quantities of these *Modioli* with similar results as to the number of the *Pinnotheres*, but in all other instances more crabs were obtained from a like number of shells in consequence of more of the *Modioli* producing two of them.

The smallest *Pinnotheres* I have seen was found by Mr. Hyndman in a living *Cardium exiguum* dredged by us in Strangford Lough in Oct., 1834. It is a male: the carapace is under a line in length; the entire breadth of the crab from the extremities of the outstretched legs is 3 lines.* The *Cardium* is under 3 lines in length, and barely exceeds that admeasurement in breadth, so that the crab when in the position just mentioned must have on both sides touched the walls of its chosen prison. The *Pinnotheres* likewise inhabits the *Cardium edule*. Before me is one

* In the Entomological Magazine, vol. iii., the *Zoea* of this *Pinnotheres* is described and figured by Mr. J. V. Thompson.

of these crabs, of which the carapace is 2 lines in breadth, obtained by Mr. Hyndman in a full-grown *C. edule* from Strangford Lough; but from the Sligo coast, where this shell attains an extraordinary large size, a crab with a carapace 4 lines in breadth, and with outstretched legs 7 lines across, was once kindly brought to me by Lord Enniskillen. Dr. Ball informs me that on two occasions he obtained a great number of the *Pinnotheres*, and which were all males, from the *Cardium edule* taken at Youghal *—about nine out of every ten cockles contained a crab. On opening oysters from Tenby, in Wales, he has likewise procured the *Pinnotheres*. This crab, like the *Pagurus*, occupies different species of shells according to its size, and at every age generally selects such as with outstretched legs it would fill from side to side—this of course will not apply to the allied species *P. Pinnæ*. On one occasion I found a female *Pinnotheres*, of adult size, alive in a *Modiolus vulgaris* six days after it had been taken from the sea—the shell-fish died on the fourth day.

P. Pinnæ, Leach.

In the collection of Mr. J. V. Thompson there is a specimen so named, and marked as Irish. It is imperfect, but appears to be the *P. veterum* of Leach, made synonymous by this author with *P. Pinnæ*. Writing on *Pinnotheres* in the Entomological Magazine (vol. iii. p. 89), Mr. J. V. Thompson remarks—"On this part [Cork] of the Irish coast but two species have been hitherto observed, viz. *P. Pisum* and *P. Pinnæ*, the latter being found in *Pinnæ* and *Modioli*."

Genus GONOPLAX.

G. angulatus, Edw.

Mr. J. V. Thompson's collection contains an Irish specimen of this crab, marked "rare." Dr. Ball has found the species in the stomachs of cod-fish, purchased in the markets of Youghal and Dublin, and commonly in those brought to the former place—four of these crabs is the greatest number he has obtained from the stomach of a single fish. In the Ordnance collection is a fine example of *G. angulatus*, labelled as procured at "Bangor [Co. Down], January, 1839."

On examination of several specimens of *Gonoplax* preserved by Dr. Ball, I cannot—judging from Leach's figure of the one and Desmarest's of the other—see any grounds for considering *G. angulatus* and *G. rhomboides* as distinct species. My specimens accord better with the latter, but may at the same time be considered intermediate: instead of the second spine on each side is the little knob or protuberance characteristic of *G. rhomboides*. From the descriptions of the two *species* there appears to be little more of difference than the relative length of spine on each side of the carapace—and this certainly is most trivial.

Gonoplax angulatus. Spring, 1848. Mr. T. W. Warren obtained on one

* With respect to another part of the coast of Cork, Mr. J. V. Thompson observes—"Let any person take a sweep with a dredge on any bank of old mussels, *modioli* or *pinnæ*, where the *Pinnotheres* have been before observed, and almost every shell will be found to contain one full-grown female, some two, and others three, independent of young ones and males, which occasionally occur in common with the females. * * * As the fishermen at Cove often have recourse to those shell-fish for bait, I have had a pint and upwards of the pea-crab brought to me out of the mussels obtained in a few hauls of the dredge."—*Ent. Mag.* vol. iii. p. 86.

day six, and on another three, of these crabs at Portmarnock: he gave me three of the specimens in May, 1840.

Genus EBALIA.

E. Bryerii, Leach.

The first native example of this species which came under my observation was obtained in the autumn of 1838, by Mr. Hyndman, when dredging in deep water in Belfast Bay. In the Ordnance collection are two specimens similarly obtained from the same locality in the following year.

Capt. Beechey, R. N., brought up two examples of this species alive in the dredge from 50 fathoms water off the Mull of Galloway.

E. Cranchii, Leach.

A single specimen was dredged from deep water in Roundstone Bay, Connemara, by our party in July, 1840. Dr. Ball subsequently found several on the beach at Portmarnock after a storm. Colonel Portlock informs me that this species was taken by deep dredging in Belfast Bay in the course of the Ordnance Survey.

E. Pennantii, Leach.

Although this species must be considered rare, it is less so than the two already noticed—*E. Bryerii* and *E. Cranchii*. A specimen (from Cork?) is in Mr. J. V. Thompson's collection. In Sept., 1836, one was dredged up from deep water in Belfast Bay, by Mr. Hyndman, and, subsequently, another was similarly obtained there by Dr. Drummond. Several were procured in the same locality by the collectors attached to the Ordnance Survey, who likewise dredged a specimen in Larne Lough. To Prof. Allman I am indebted for one which he found in Dublin Bay.

Three examples of the *E. Pennantii* were brought up alive in the dredge from a depth of 50 fathoms off the Mull of Galloway by Capt. Beechey, R. N.

Two specimens dredged in Dalkey Sound by Dr. Ball.

Genus ATELECYCLUS.

A. heterodon, Leach.

Mr. Templeton notices a crab of this species as found by him "in the stomach of a cod-fish, Jan. 17th, 1817." In Mr. J. V. Thompson's collection is an Irish specimen probably from Cork. In Jan., 1839, I obtained a perfect adult male from the stomach of a brill (*Pleuronectes rhombus*) taken at Ardglass, County Down; it somewhat exceeds in size that figured by Leach, which again is larger than Montagu represents the species; the hairs are not confined to the arms and legs, the carapace being likewise covered with them. The circumstance of this species being found in the stomachs of the cod and brill would indicate—were we not otherwise informed—its being an inhabitant of deep water. In the Ordnance collection are examples of this crab from Moville (Co. Donegal), Portrush, near the Giant's Causeway, and Carrickfergus. Dr. Ball has twice obtained it on the Dublin coast: on one occasion many specimens were found by him on the beach at Portmarnock after a great storm. Montagu remarks that several of the *A. heterodon* which he procured were all males, and Dr. Leach mentions females

as extremely rare. The several Irish examples I looked to with reference to their sex were likewise males. It may be remarked, that in this species the females might, from the very narrow form of the abdomen, be without due attention regarded as males.

In the month of September, 1835, I obtained several small living specimens of *Atelecyclus* (carapace about 2 lines in length) in rock-pools accessible at low-water at Bangor, County Down. They differ a little in the contour of the shell (which is not so round), and in the form of the teeth between the orbits, from the adult *A. heterodon*, but on account of their diminutive size, and in the absence of specimens of all ages for comparison, it would, I conceive, be rash to consider them otherwise than this species.

Genus CORYSTES.

C. Cassivelaunus.

"Found on the shore at Cushendall Bay," Templeton. Marked as "Irish" in Mr. J. V. Thompson's collection. This species is commonly found after storms on the sandy shores of the North and East of Ireland. In the month of August, 1836, a number of very small specimens were dredged from a sandy bottom in the open sea off Dundrum, Co. Down, by Mr. Hyndman and myself. The smaller the individuals of this species, the antennæ are the longer in proportion to the size of the body: some of these with the shell or carapace 3 lines in length have the antennæ 6 lines long; on this account the young present a very singular and grotesque appearance: none of those taken on this occasion had the carapace more than 6 lines in length. In the stomach of a smooth dog-fish (*Mustelus lævis*), captured in Belfast Bay, I found a perfect adult specimen of this crab.

Dr. J. L. Drummond informs me that he has frequently taken this species at Bangor at neap-tides, when he detected it by the antennæ (which were always in contact with each other) being protruded above the surface of the sand for nearly their whole length. Dr. Ball, who has found these crabs in abundance at Youghal and Dublin, has seen them shake themselves down in the sand so as to conceal all but the antennæ as described. He is of opinion that the antennæ are not thus protruded for any special object, but simply that the animal feels itself sufficiently concealed when the body is covered.

Carnlough beach, W. T., *Corystes*. I find a few perfect specimens every day, Newcastle, Co. Down, July, 1851.

Oct. 9th, 1851. Newcastle, Co. Down, *Corystes*. Severe gales at the beginning of this month cast many ashore.

Genus THIA.

T. polita, Leach.

Galway, burrowing in sand. Professor Melville.

2ND SECTION, DECAPODA ANOMOURA.

Genus LITHODES.

L. Maia, Leach.

Templeton says of this species—"Found on the coast of the County Wexford: a specimen thence is in Trinity College Museum [Dublin]. It is called by the people *craban*." *

I have not seen any Irish example of this crab, but am indebted to Dr. Wylie of Ballantrae, Ayrshire, for a very fine specimen which was taken in a herring-net there in the summer of 1838, in water from twenty to thirty fathoms in depth. It was brought to Dr. Wylie by the fishermen as a species which they had never before met with.

Genus PAGURUS.

P. Bernhardus, Edw.

Hermit-crabs of this species are very common in univalve shells around the coast of Ireland. Leach mentions their "first occupying the shells of the common periwinkle or trochus" (Art. Crustaceology in Edin. Encyclop.); but some examples in my collection are much smaller than those contained in the species just named. They are in the *Littorina retusa*, *Turritella terebra*, and *Nassa macula*; univalves from this size up to that of the largest *Buccina* are commonly inhabited by the *P. Bernhardus*: a specimen of this crab from the coast of Down, in my collection, is 6½ inches in length. Samouelle speaks of the shell occupied by the *Pagurus* being "destined to preserve the body from injury, and to guard them from the attacks of fishes, which would otherwise devour them." Entom. Compend., p. 92. In this latter respect the shells are of little service, as I have remarked *Paguri* very commonly in the stomachs of various species of fishes, but especially in the omnivorous and voracious cod: all the moderate-sized and large hermit-crabs which have thus occurred to me must have been dragged from their shells, which, in no instance that I recollect, were found in the stomach of the fish along with them.

One of these crabs inhabiting a *Buccinum undatum* was brought up alive in the dredge from a depth of fifty fathoms off the Mull of Galloway. See Annals, vol. x. p. 21.

P. Prideauxii, Leach,

Has been taken by Mr. Hyndman and myself when dredging in Strangford and Belfast Loughs, and in the open sea off Dundrum, County Down, and in every instance occupying the shell invested by the *Adamsia maculata* (*Actinia maculata*, Adams). Leach states that "Mr. Prideaux has observed it in a vast variety of habitations, even in the tubes of the *Dentalia* and in the shell of *Scaphander lignarius* [*Bulla lignaria*]:" no allusion is made to its connexion with *Adamsia*.

To me this appears singular, for among the very numerous specimens of *Paguri* in my collection from all quarters of the Irish coast, and found inhabiting shells of various species, not a *P. Prideauxii* occurs, except in connexion with the *Actinia* already named. This is a remarkable fact.

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* Dr. Ball thinks there is some mistake here. *Maia Squinado*, probably.—ED.

The connexion of the two species is surely more than accidental. It may be further stated, that in the localities whence *P. Prideauxii* was obtained *P. Bernhardus* is very common; and in the loughs mentioned a few individuals of two or three other species of *Paguri* have been procured.

I had observed the occurrence of the *Pagurus* in *Trochi* [*T. cinereus*, &c.], and *Bulla lignaria*:—to these may now be added *Buccinum undatum* and *Natica Alderi*. The smaller shells thus resorted to, as the last-named, and *Trochus cinereus*, may be said to have merely formed the apex of the tenement, as "the thin horny expansion attached to the aperture of the shells, and forming as it were an extension of the body-whorl in a spiral form," * constituted from one-half to two-thirds of the entire habitation of the crab.

Dr. Coldstream, in treating of the *Actinia maculata* obtained by him at "Torbay, and in Rothsay and Kames Bays in Bute," remarks, that the shell which it covered was "always found inhabited by a variety of the hermit-crab." The "variety" thus alluded to was probably *P. Prideauxii*. By Dr. Coldstream, and also by myself, the *Actinia* and *Pagurus* under consideration have always been found associated. Dr. Leach makes no mention of their connexion; and Prof. Forbes states that not a single specimen of the *Actinia* taken in the course of a season by him about the Isle of Man "had either hermit-crab or horny disc." (Annals, vol. v. p. 183.) It would thus appear, that on the British coasts this strange companionship is not invariably constant. By Dugès the two species have been found associated on the coast of France.

Dr. Coldstream enters pretty fully into the subject of the "horny expansion," and, after speculating upon its formation, thinks that it is probably "produced by the *Actinia*." Opposed to this view, however, is the fact, that shells possessing the horny expansion are frequently dredged in localities where the *Actinia* was never met with—and where the *P. Prideauxii* never occurred. I have often found them tenanted instead by *Pagurus Bernhardus*.

On examining such shells with horny expansions as are preserved in my cabinet, I find the expansions to consist simply of a development or continuation of the *Alcyonium echinatum* (and which it occurred to Dr. Coldstream might be the case) beyond the shell itself after this is covered, or nearly so, by the zoophyte. May not this *Alcyonium* be selected by the *Actinia* as a base upon which to fix itself, on account of its papillary eminences, thereby enabling it—the parasite—to retain a firmer hold or "seat"?

Newcastle, Co. Down, Oct. 2nd, 1851. I found the remains of a full-grown one in the stomach of a cod-fish taken off here.

Oct. 10th. There have been severe gales of late. On the beach, North of Newcastle, I found three or four adult specimens to-day, all freed from shells; more than I ever saw of *P. Bernhardus* here in a day, i. e. on the beach three Irish miles in extent, walked back and forward by different tracks.

P. erinaceus, J. V. Thomp.†

In the collection of Mr. J. V. Thompson is an Irish specimen of a *Pagurus* considered as undescribed, and so named by him.

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* Dr. Coldstream in Edin. New Phil. Journ., vol. ix., and copied in Johnston's British Zoophytes, p. 219.

† Mr. J. V. Thompson's collection is now in the Royal Dublin Society's Museum.

On examination of this specimen in College of Surgeons' Museum, it seems to be my *P. Cuanensis*, W. T., March, 1847.

P. Cuanensis, Thomp.

Found in *Triton erinaceus* at Portaferry, and in Bangor Bay, W. T. Belfast Bay, Dr. Drummond.

June 22, 1846. A specimen of this *Pagurus* was dredged in Strangford Lough, in fifteen to twenty fathoms water, by Mr. Hyndman and myself. It was alive and inhabiting a *Trochus magus*. A conspicuous character was presented in its beautifully ringed antennæ. These were of a bright red hue alternating with pure white or yellowish horn-colour, the rings of each colour very unequal in extent. The portion of the body exposed to view, when this *Pagurus* is *in situ*, is prettily mottled over with reddish brown and white.

P. ulidianus, Thomp.

Portaferry, W. T.

P. Hyndmanni, Thomp.

In *Turritella terebra*, at Portaferry, W. T. Belfast Bay, Dr. Drummond.

P. lævis, Thomp.

Portaferry, W. T.

P. Forbesii, Bell.

In 20 to 35 fathoms outside of great Isle of Arran, Professor Melville.

P. Thompsoni.*

Genus PORCELLANA.

P. platycheles, Edw.

This littoral crab seems to be a local species, but plentiful where it does occur; Templeton notices it as found on the "Whitehouse shore by Mr. James Grimshaw, jun." On the beach near Carrickfergus, a few miles distant from that locality, it was procured in abundance in June, 1835, by the late Mrs. Patterson of Belfast, who subsequently obtained it near Cultra, on the County Down shore of the Bay. Dr. Ball states that this species is very abundant on the shores of the County Dublin, and especially at Portmarnock; he remarks that in once turning over a large stone here in cold wintry weather the under side was entirely covered

* *P. Thompsoni*, Bell.

Dredged in 50 fathoms, entrance to Belfast Bay, Mr. Hyndman. This fine species is described in the end of Bell's Crustacea with the following remarks:

"I have a melancholy gratification in dedicating this species by name to a gentleman who for many years was justly considered as the representative of the Zoology of Ireland, and whose acute discrimination and persevering enthusiasm in his favourite pursuit were only equalled by the liberal and unselfish feeling with which he placed his treasures in the hands of his fellow-labourers, whenever he believed the interests of science would be thereby furthered. The specimen from which the above description is taken was placed in my hands by my lamented friend, only a very few days before his untimely death deprived the science of Ireland of one of its most distinguished ornaments, and society of as kind and true-hearted a man as ever lived."—(*Bell's Crustacea*, p. 373.) Ed.

with these crabs, "packed as close to each other as tiles on a roof!" In June, 1838, I found the *P. platycheles* in numbers beneath large stones at the island of Lambay, off the Dublin coast; on the 1st of this month the females abounded in ova. At Lahinch, County Clare, this species occurred to Prof. Forbes and myself in July, 1840, between tide-marks, and beneath the same stones *P. longicornis* was met with alive. Tory Island, Mr. Hyndman.

P. longicornis, Edw.

This species chiefly inhabits deep water on our coasts, but in some localities lives on shores exposed at the ebb of every tide. It has been dredged up in abundance in the Loughs of Strangford and Belfast, and in the open sea off the North-East coast of Ireland, in 1834, and subsequently by Mr. Hyndman and myself. It is generally found in connexion with large shell-fish brought up from deep water, such as oysters, horse-mussels (*Modiolus vulgaris*), or clams (*Pecten maximus*), and shelters itself under any extraneous matter or natural roughness (as between the testaceous layers of an old oyster) sufficient for the purpose. Dr. Ball's collection contains specimens from Youghal and Dublin Bay:—on the shore of the island of Lambay I have taken it alive, as well as at Lahinch on the western coast.

Specimens of this crab have been sent me from the coast of Wigtonshire, Scotland, by Captain Fayrer, R. N.

3RD SECTION, MACROURA.

Genus GALATHEA.

G. strigosa, Edw.,

Would appear to be distributed around the coast, but everywhere in very limited numbers. Templeton notes it as found at "Bangor, Co. Down, November, 1819, and in the stomach of a cod-fish." It is enumerated in Mr. J. V. Thompson's catalogue, his specimen being probably from Cork. Two were captured by Mr. Hyndman and myself, when dredging in Strangford Lough in October, 1834; and others have subsequently been added to my cabinet from the rocky coast of Antrim, as from Island Magee; Glenarm; the vicinity of the Giant's Causeway; one or two only from each place: at the last-named, a couple of individuals, which were brought to me alive in the month of June, were captured under stones at low-water. The species may probably resort to the shallows to deposit their ova, which in these examples were ready for exclusion. The Ordnance collection contains the *G. strigosa* from Belfast Bay. Dr. Ball has a specimen from Dublin Bay:—its length of body is $4\frac{3}{8}$ inches; arm from basal insertion to end of claw $4\frac{6}{8}$ inches.

In March, 1835, a *G. strigosa* from Portpatrick was kindly sent to me by Captain Fayrer, R. N.; and on the beach at Newhaven, near Edinburgh, I once picked up a very large one, which had probably been thrown out of some of the fishing-boats. At Ventnor, in the Isle of Wight, one which had been captured in a crab-pot was brought to me; it was $5\frac{1}{4}$ inches in length from the points of the claws to the extremity of the tail-plates.

Both the young and adult specimens in my cabinet are highly attractive, from still retaining their fine red and bright blue markings.

G. rugosa, Leach,

Is noticed as Irish by Mr. J. V. Thompson. The specimens which I have seen were mostly found in the stomach of the cod-fish. Dr. J. L. Drummond thus obtained two of them from fish brought to Belfast market. In a cod taken near Carrickfergus, I once found a fine male *G. rugosa*; its length of body from base of eyes to extremity of tail-plates, 3 inches; its arm from base to point of claw, 5½ inches. Another individual was found in the mouth of a haddock captured at Killough, County Down. Dr. Ball in one instance procured three specimens from the stomach of a cod taken at Youghal. Dr. Leach remarks "that the *G. rugosa* appears to be a very rare species in Britain," and so may it likewise be considered on the Irish coast. It is probably one of those species not to be found in numbers anywhere.

A *G. rugosa* has been kindly sent to me from Portpatrick by Captain Fayrer, R. N. Several small individuals were dredged alive in water from 110 to 140 fathoms in depth off the Mull of Galloway. See Annals, vol. x. p. 23. None of them exceeded 1½ inch in length of body.

Among the genera of Crustacea which possess a luminous property when living, *Galathea* is included, and the species particularized is the *G. amplectens*, Fabricius (M'Culloch's West. Isles, Scotland, vol. ii. p. 192), observed by Sir Joseph Banks on the coast of Brazil. It is perhaps not worth remarking, that in a dead specimen of *G. rugosa* I observed the same property. On the evening of the second day after it had been kept in a warm room, the entire soft portion of its under surface was highly luminous.

G. squamifera, Leach,

Is marked Irish in Mr. J. V. Thompson's catalogue. It is our most common species of *Galathea*, and is found on all sides of the island. It is not uncommonly dredged up by us in the Loughs of Strangford and Belfast, the specimens being generally of a small size. In the Ordnance collection are examples from Portrush, near the Giant's Causeway. At Lahinch, County Clare, two of the *G. squamifera* were procured by us under stones between tide-marks. Specimens from Youghal and the western coast are in Dr. Ball's collection.

Captain Fayrer, R. N., has favoured me with this species from Portpatrick.

G. nexa, Embleton.

I have found it in the stomachs of cod-fish brought from the coasts of Down and Antrim to Belfast market; and in Dr. Drummond's collection are specimens which were similarly procured. A comparison of one of these with an original specimen in Dr. Johnston's possession, proved (what from its agreement with the description and figure I had previously little doubt of) the identity of the species.

Genus PALINURUS.

P. vulgaris, Leach.

The spiny lobster is found sparingly on the North, but commonly on the South coast. Smith in his History of Kerry remarks, that one side of Dingle Bay "is noted for having very large cray-fish," and in his History

of Cork, states that "we have of them in great plenty from 1 lb. to 6 or 8 lbs. weight on the South coast of Ireland." Rutty, in his Natural History of the County of Dublin, says of the *Palinuris*, "this, though common on their tables at Cork, and a more delicate food than the lobster, is rare in Dublin, though sometimes brought to our market from Munster, and sometimes from England." Dr. Ball informs me that it is still occasionally brought to Dublin, and that it is at the present time rather commonly taken at Youghal along with lobsters, and of the size noticed by Leach—from 18 to 20 inches in length of body. It is considered coarse food at the last-named place. A specimen obtained many years ago at Magilligan, County Londonderry, is in Mr. Hyndman's collection; one or two have subsequently been procured there by the Ordnance Survey, as well as on the coast of Donegal. A specimen captured in a crab-pot at Carrickfergus is preserved in the Belfast Museum.

Genus GEBIA.

G. deltura, Leach.

In the stomach of a haddock (*Gadus Æglefinus*) taken off Newcastle (Co. Down) on the 6th March, 1847, I was interested in finding two perfect arms of this rare fossorial species, hitherto known to have been obtained only on the coast of Devonshire. They are of the size represented by Leach, Bell, and M. Edwards. The stomach of the fish was with the exception of them filled with the remains of *Ophiura texturata*. It was from the same locality that I obtained the arms—and these only—of the two other fossorial genera *Callianassa* and *Calocaris* in March, 1839. The reason of these parts alone of the animal being taken may perhaps be owing to their being above the surface of the bank, ready to lay hold of any food within their reach, while the body remains concealed, and the ground-feeding fish seizing on them, the Crustacean sacrifices its exposed members rather than give up its whole body to its assailant.

Professor Bell remarks:—"The difference of the depth which the various species of this fossorial family inhabit is very remarkable; the present species [*Gebia stellata*] with *Callianassa subterranea* being found in a sand-bank, when digging for *Solenes*, whilst *Calocaris Macandreæ* was dredged from the astonishing depth of 180 fathoms." (*Hist. Brit. Crust.*, p. 224.)

The difference here noticed is interesting in so far as the facts narrated, but can scarcely be considered characteristic of the respective species. My specimens of *Callianassa* and *Calocaris*, if not taken from the stomach of the same individual fish, a *Platessa pola*, Cuv., were procured from two fishes of that species taken at the same sweep of the trawl-net on the same bank at a depth of 10 fathoms. The *Gebia* was probably taken at a similar depth.

Genus CALLIANASSA.

G. subterranea, Leach.

"*March* 25, 1839.—On examining the contents of the stomach of several individuals of the *Platessa Pola*, which were taken early this morning off Newcastle (County Down), two of the larger arms of this species, so peculiar in form and still retaining their beautiful pink colour, were detected."

Genus CALOCARIS.

C. Macandreæ, Bell.

Anterior hands found in stomach of a flat-fish.

Genus ASTACUS.

A. fluviatilis, Edw.,

Inhabits the rivers in many parts of Ireland, but is generally stated to have been introduced to its recorded haunts from other quarters. Thus, Rutty in his Natural History of Dublin remarks, "It has been sometimes found in this country, chiefly in gentlemen's ponds, and lately in the river near Finglass; but said to have been brought thither from Munster." In an essay on the parish of Templepatrick, written in 1824, it was stated, that "the lady of the late Arthur Upton introduced a stranger into our river called craw-fish. It was put into the brook at Templepatrick; it descended the Six-mile Water, where it found a situation perfectly suited to its nature, deep water and banks of loam, which they excavate as lodgings for themselves and their young; they have increased to a very great multitude." This locality is about ten miles distant from Belfast. The date of the introduction of the cray-fish unfortunately is not given, nor are we informed whence they were brought. About thirty years before the essay was written, as I am informed by a venerable friend, cray-fish were plentiful some miles farther up the river than where they are said to have been introduced. They were obtained in drains connected with the river near Doagh, and were not sought for as a marketable commodity, but served up at the table of the Antrim Hunt, to gratify the special palate of one of the knightly members of that body.

About Florence Court, County Fermanagh, the cray-fish is abundant, but to this locality also, Lord Enniskillen tells me, that the species is said to have been introduced many years ago from Queen's County:—of the correctness of this, as in former cases, there is no proof. About two years ago, however, I had "ocular demonstration" of the introduction of the cray-fish into a pond at Lismoyne, the seat of a relative near Belfast. Early in September, 1840, supplies taken in a small river in the County of Kildare were from time to time forwarded by the coach from Dublin to Belfast, and arrived in tolerable condition on the second day after capture; sometimes all were alive and apparently in good health; at others, perhaps one-fourth would be sickly or dead. At this period none contained ova, but a supply sent forward in the middle of November had them well developed. It may be worth mentioning that these cray-fish were captured by a man wading up to his middle in the river, and thrusting his hands into their burrows in the banks—the water must be low at the time to render the holes visible. When caught they are generally put in a bag containing a little hay, and by being kept cool will live a few days out of the water. They are likewise taken in numbers by baiting with chickens' entrails a common creel or basket, which is let down by a rope to the bottom of the river in the evening, and next morning is pulled up so quickly, that the contained cray-fish, having no time for escape, are all captured.

River Erne, near Belturbet, Mr. Getty.

Templeton says of the *Ast. fluviatilis* that it "inhabits several of our lakes and rivers; near Antrim, in the Six-mile Water; in great abundance in a lake near Tullahan, County Monaghan." About Ballibay and Glas-

lough in this County it is now said to be met with. About Kill Lake, Lough Sheehan, &c., in the neighbouring County of Cavan it is found.* Dr. Ball states that the cray-fish is taken in the Royal Canal about twelve miles from Dublin, and in other places in Kildare.

Mr. Patrick Doran, a well-known and intelligent collector of objects of natural history, gives me the following account of cray-fish, as observed by him in Killymoon river, near Cookstown, County Tyrone, when the water was very low. They ascend from the deeper to the shallower parts to spawn. It is the office of the males to cater for the young. He has seen them catch minute fish and *Gammari*, bring them to the female and young, and break the fish up in pieces for the latter, so as to muddy the water in the process. On being disturbed, both sexes gather the young under their tails "as a hen gathereth her chickens under her wings;" but a singular difference prevails between the sexes with regard to their manner of protecting their progeny. The male on being lifted out of the water retains the young under his tail; but the female on being captured, wiser than her lord, slaps them from her into their native element with great force, thus producing an effect which is likened by my informant to "a shower of rain upon the surface." He has repeatedly witnessed this different procedure of the two sexes.

Dr. Ball supplies me with the following note:—"Some years ago I kept a cray-fish for a considerable time in a shallow glass-vessel, about twenty inches in diameter, and containing about two inches depth of water. This animal gradually acquired great viciousness, and would eagerly attack the fingers of any one who chose to put them within his range, pursuing the intruding digits round the boundaries of his demesne. After he had been thus a year in my possession, I was one day surprised to see a second cray-fish in the vessel, but on taking the intruder in my hand (believing it to have been placed in the vessel by a waggish relative) it proved to be the exuviæ of my old friend, so perfect as to present his exact counterpart. Instead of his usual boldness, he now exhibited the most remarkable timidity, which continued for three or four days. He was at first quite soft, and appeared considerably larger than before, but gradually grew firmer, and on the fifth day felt to the touch as hard as usual, and advanced with open pincers to the attack of my finger, though evidently not without some little doubtfulness of his powers. Before the end of the week he was himself again, came on more boldly that ever and with greater effect, as his weapons were much sharper. He lived nearly two years with me, and during the whole time received no food excepting a few worms. The water was never changed, but some was occasionally added merely to supply the loss by evaporation. I had found by previous experiments that cray-fish placed in pans with much water died,

* In Mr. Hyndman's cabinet there is a specimen of a cray-fish considerably smaller and more delicately proportioned than the *A. fluviatilis*, and apparently a different species. It is believed by him to be Irish, but of this he is not certain. A very intelligent lady who saw the specimens above alluded to from Kildare—and which were the ordinary *A. fluviatilis*—remarked on their being much larger than those she had been accustomed to see in County Cavan. On Mr. Hyndman's *Astacus* being shown, it was stated that of the quantities which she had seen served up at table, none were ever larger. They were taken in one of the tributaries to Lough Sheehan, about 1½ mile above the lake, and eight miles from the town of Cavan. I have as yet been unable to obtain cray-fish from this locality. Silence would perhaps have been more judicious, than the introduction of matter of this kind without any *positive* evidence.

while those which were merely covered, or in such a manner that they could raise a portion of their bodies above the surface, lived as long as they were taken care of."

Genus HOMARUS.

H. vulgaris, Edw.

Lobsters are in plenty around the rocky shores of Ireland. From the iron-bound North-eastern coast great quantities of them are now sent by the regularly plying steamers to Glasgow. About Dublin, Dr. Ball informs me that the flounder (*Platessa flesus*) is used as bait for the lobster; and at Youghal, that the best plaice (*Platessa vulgaris*), which would bring a good price at market, are cut up for the same purpose.

The lightest looking and most tasteful lobster-pot that I have seen is that used at the South Islands of Arran (off Galway Bay). It is of the form and about the size of a tenor-drum. The frame-work consists simply of a small hoop at each end fastened to three almost equally light but tough pieces of wood, so as to present the drum form; over all a net is stretched, having an opening in the centre of each end. The bait used is fish.

Genus NEPHROPS.

N. Norvegicus, Leach.

Templeton says of this—"a rare species, but sometimes found in Belfast Lough." I have heard of its being taken near Portaferry about the entrance to Strangford Lough, and that it has been procured in numbers off Dundrum on the Down coast, but specimens have not come under my observation from these localities. It is brought in great quantities to Dublin as an article of food, and is chiefly used by the poorer people. Dr. Ball informs me that the species is very numerous in Dublin Bay, off the Pigeon House, and that hence the town is supplied; he has taken the *Nephrops* along with *echini* and star-fish from the stomachs of cod bought in Dublin.

Specimens have been obligingly sent to me from the island of Holyhead (Wales) by Captain Fayrer, R. N.

Nephrops Norvegicus.—Newcastle, Down, Sept., 1851.—An old fisherman here informs me, that this species is taken commonly between this and the Isle of Man, by the trawl, in from 50 to 60 fathoms. These boats take all their fish to Dublin, and hence it, and not Belfast, is supplied with them.

Nephrops Norvegicus.—Oct., 1851.—Patrick Doran tells me, that on the bank (25 fathoms water over it) off Glassdrummond (Co. Down) he has seen great quantities of these taken in trawl nets. The *Nephrops* goes in shoals, and he has known several instances of above a ton weight of them being taken by a boat in a day. They are doled out 5 or 6 cwt. a day to the salesmen in Dublin, a *fresh* supply turned out every morning so long as they last. He says that, different from the *Isocordia Cor*, these are taken on various banks, off Down, South, and Dublin coasts, or "between Glassdrummond and Dublin."

Genus CRANGON.

C. vulgaris, Leach.

The shrimp, being an article of food, is noticed in several of our old County histories. It is common on the sandy shores and adjacent saline

marshes from North to South of Ireland. I have taken them at mid-winter as well as midsummer filled with ova. The western shore of Belfast Bay was many years ago of a hard sandy nature, so as to admit of being ridden over by persons on horseback. At that period, as I am informed, shrimps abounded there, and were regularly sought for as objects of sale. At present this same part of the shore is soft and oozy, and the shrimps so very limited in number and small in size, that they are never looked after. Although this species chiefly frequents sandy shores, I have occasionally seen it brought up in the dredge from deep water and at a considerable distance from land, in the Loughs of Strangford and Belfast. Dr. Ball mentions that shrimps, though existing in large quantities at Youghal, are held in little esteem, but that the prawn (*Palæmon serratus*), caught abundantly at spring-tides, is much thought of—this latter is called "shrimp" there; the former the "grey shrimp:" this term is also used in Smith's History of the County of Cork, written nearly a century since.

C. fasciatus, Risso.

Among Crustacea lately submitted to my examination by Dr. R. Ball are two individuals of this species, which were taken by him at Bray in July last. They are nearly 1 inch in length, and exhibit masses of mature ova. The species is admirably characterized in Milne Edwards' description above referred to. Its short thick *form* at once arrested my attention as distinct from that of *C. vulgaris*:—the *colour* designated by the trivial name *fasciatus* does not so distinguish it. One specimen exhibits a blackish band on the fourth segment of the abdomen, and the other none; and the greater number of specimens of *C. vulgaris* from various parts of the Irish coast examined in reference to this character have more or less of a blackish band on this segment. It is slightly shown too in Sowerby's figure on Leach's Malacost. Podophth. Brit. This species had not been noticed as British, but has I believe been lately obtained by Professor Bell.

C. sculptus, Bell.

In 20 fathoms, S. sound of Arran, Professor Melville.

C. bispinosus, Westwood.

In 30 fathoms, Galway Bay, Prof. Melville.

Genus PONTOPHILUS.

"*P. spinosus*," Leach.

In Mr. J. V. Thompson's collection there is a specimen bearing the former name, and marked as Irish. It is much to be regretted that the notice of the Irish Crustacea in this collection (now in the College of surgeons, Dublin), is limited to a single letter, the initial "I" simply indicating them, as "F" does the foreign species. The native specimens were, I believe, chiefly derived from the harbour of Cove, whence those were brought upon which that naturalist founded his highly important and celebrated Researches into the Metamorphoses of the Crustacea.

Genus PROCESSA.

"*P. (vel Nika) canaliculata*," Leach.

Irish examples of this species are in Mr. J. V. Thompson's collection.

Genus ATHANAS.

A. nitescens, Leach.

A single specimen was found under a stone between tide-marks at Lahinch, County Clare, by Prof. Forbes and myself in July, 1840.

Genus HIPPOLYTE.

H. varians, Leach,

Is an inhabitant of deep water around the coast. Mr. J. V. Thompson's collection contains Irish specimens. This species has been dredged in Belfast and Strangford Loughs, by Mr. Hyndman and myself, and was similarly procured by our party in July, 1840, in Clew and Roundstone Bays, on the western coast. In Dalkey Sound, Dublin Bay, an *H. varians ?* was taken by us in the dredge.

H. Cranchii, Leach,

Is marked in Mr. J. V. Thompson's collection as Irish.

H. Thompsoni, Bell.

N. W. coast of Ireland, W. T.

Genus PANDALUS.

P. annulicornis, Leach,

Is in Mr. J. V. Thompson's collection. The species has been taken commonly by Mr. Hyndman and myself in the rock-pools accessible at low-water throughout the Down coast, and has been dredged by us in deep water on the North-East coast, and in Killery Bay, Connemara. Dr. Ball has specimens from the shores about Dublin.

Dredged off Donaghadee, Dr. Drummond.

Genus PALÆMON.

P. serratus, Leach.

The prawn, an article of human consumption, is noticed in some of our old County histories, as Harris's Down, Smith's Cork and Waterford, Rutty's Dublin. The last author says, apparently * with reference to this species, that "it was formerly frequent on our coast, but the frost in 1740 destroyed many of them"! vol. i. p. 379. Templeton speaks of it as "once common in Belfast Lough; now rare." Some years ago I obtained from this locality a very large specimen, which was taken in a lobster-pot at the entrance of the bay. Here the species has more lately been obtained by the collectors attached to the Ordnance Survey, who likewise procured it at Portrush near the Giant's Causeway. Dr. Ball states, that at Youghal prawns are taken only during the first quarter of flood-tide, and then plentifully: at the South Islands of Arran he captured numbers of them in the summer of 1835, and out of about fifty, found three with *Bopyri* attached.—See Annals, vol. v. p. 256.

P. Squilla, Leach.

Templeton notices this species as "common on the shore of Belfast Lough." It is of frequent occurrence in rock-pools throughout the range

* He refers to Rondeletius for the species meant, a work which I have not at present to consult.

of the Down coast, and is likewise occasionally taken in deep water with the dredge.

Donaghadee, 8—10 fathoms.

Palæmon Squilla.—Newcastle, Down, August, 1851.—I have been much interested by looking at these creatures in their native rock-pools to the southward of Bloody Bridge, where, at the extreme of high-water only, they derive any new accession of sea-water. They swam about within a few inches of me, and both in form and colour were highly attractive. They settle (as bees do on flowers) to browse upon the algæ (*ceramium rubrum*),* and with their pretty cærulean claws apparently draw the plants to their mouths.

I brought some home with me, and put them in a pan of sea-water filled within two inches of the top. They frequently jumped out of this on the table, where they even *ran* quickly. One of them leaped from the table into the pan of water again, which required a leap of above four inches in vertical height to clear the edge, the pan being four inches high. Their sight is very acute. They are tenacious of life, as I brought them in a phial in my pocket for three miles, and they were as active after being 24 hours in our house as when captured. I did not keep them longer. They were several times five or six yards from the pan of water, including a leap from the table to the floor of the room. Though this leap was nearly three feet, they were nothing the worse for it, but as active as ever on being replaced in the water.

P. varians, Leach.

A few examples have been procured in Belfast and Strangford Loughs by Dr. Drummond and myself. Leach remarks that the *Astacus squilla* of Pennant may be his *P. varians*.

P. Leachii, Bell,

Is the name attached by Mr. J. V. Thompson to an Irish specimen in his collection.

Genus PASIPHÆA.

P. Sivado, Risso.

In the British Museum there is a specimen so named, and labelled "Ireland." From the donor, the Rev. James Bulwer, I learned that it was taken by him in the vicinity of Dublin.

Genus CUMA.

Cuma trispinosa, Goodsir.

Portaferry, Strangford Lough, 1838, Mr. Patterson.

Genus ALAUNA.

? *A. rostrata*, Goodsir.

The occurrence of an individual of this species to me at Newcastle (Co. Down) in Aug., 1836, was noticed in the Annals, vol. xiii. p. 435, accompanied by a mark of doubt as to the species. When lately looking over some Crustacea dredged from 5 fathoms at the Skerries, on the Dublin coast, in the autumn of 1845, by Dr. Ball and Professor Edw. Forbes, I was gratified to see several specimens quite similar to the one that I had

* On bringing some of these algæ home to preserve, I found their tops had been much injured,—eaten off, I presume, by these *Palæmons*.

myself taken. They are about 6 lines in length, and agree in all respects with Goodsir's description, but present at the same time a striking character which he has not noticed—in the carapace being almost wholly covered by series of minute granular spines (if such an expression may be used) with the points directed forward, and hence my "?" as to species. The describer of *Alauna* obtained but the one specimen.

ORDER STOMAPODA.

Genus MYSIS.

M. spinulosus, Leach.

South of Ireland.

M. Chamæleon, Thomp. (J. V.)

The first examples described under this name were obtained in the harbour of Cork. Specimens from each side of the island have come under my notice. At Bangor, within the entrance of Belfast Bay; Ballywalter, on the open coast of Down (both strictly marine localities); in Dundrum Bay, same County (in brackish water); and in the tidal river Lagan at Belfast; I found them common in the summer or autumn of 1835 and 1836. In the three first-named places they were taken between tide-marks; in rock-pools in the two first, and in a sandy bay in the last. I have seen it among Crustacea brought up in the dredge in water 5 fathoms deep off the Dublin coast by Dr. Ball; have received it from the West coast of Cork (Professor G. J. Allman), and have taken it myself along the shores of Connaught. A detailed note of June 22, 1846, is as follows:—When in company with Mr. Hyndman to-day at Strangford Lough, I took a number of this species (which is admirably figured in the work quoted) in brackish water, at Ardmillan. They were in extraordinary profusion, and viewed in the water were at first sight mistaken for the fry of fish. They appeared to be all about the same size, and adult, as were the specimens taken, the largest exceeding 1¼ inch in length from point of anterior scales to end of the caudal plates.

Mr. J. V. Thompson remarks that *M. Chamæleon* "has never been observed like the other species in any great numbers together, but scattered and solitary, often associated with *M. vulgaris*," p. 29. But where they came under my observation in this instance, a small arm of the lough a few feet in depth presented the extraordinary spectacle of being quite alive with them. They were all swimming in one direction, towards the sea, and moving regularly and horizontally onward.

It is difficult, owing to the figure being deficient in elaboration, to judge whether or not Montagu's *Cancer astacus multipes*, Linn. Trans., ix. (p. 90) pl. 5, f. 3, be this species, but I agree with Mr. J. V. Thompson that the *Cancer flexuosus*, Müll. Zool. Dan., vol. ii. p. 34, pl. 66, is so. M. Edwards (Hist. Crust., vol. ii. p. 458) observes, that spines are represented on the sides of the abdomen in Müller's figure of *M. flexuosus*, but although such an appearance is presented in the plate, surely it is the mere setæ of the subabdominal fins which are intended to be represented. The specimens taken on this occasion were all of one hue, as the millions in the water seemed to be; this was a very pale olive or "pellucid cinereous," as ascribed to the *M. Leachii* by Mr. J. V. Thompson, from which they differed only in having black instead of "reddish rust-

coloured" spots. Each segment of the body in every specimen examined (about thirty in number) is marked with a round black spot, whence, in some, arborescent arms branch off; in others there is no arborescent appearance, but the segment is dotted regularly over with extremely minute points.

M. vulgaris, J. V. Thomp.

On the occasion mentioned my attention was first directed by remarking among those captured, individuals wanting the black spot on the segments of the body, when, singling out three of these, they proved to be of this species—all the others were *M. Chamæleon*. The segments however exhibit an arborescent veining, though wanting the black central spot. These specimens are one inch in length, or one-fifth less than the largest *M. Chamæleon* taken with them. If the proportion of the one species to the other in the myriads seen were as in those taken, the numbers of *M. vulgaris* to the other were but as one to ten. Some of these (*M. vulgaris*) produced young in the phial, like those represented by Müller in the Zoologia Danica, pl. 66, and by Kroyer in the Voyages Scandin. et Lapon. Crustaces, pl. 9.

Ballyhome, Belfast Bay, July 4, 1846.—From the rocks at the entrance of this bay I captured in pure sea-water a number of the *Mysis* of various sizes, all of which proved to be *M. Chamæleon*. The extraordinary difference in colour of these specimens, all taken together within the space of a few yards, well justified the specific name. They were brown, green, pink, red, and hyaline, some as transparent in colour as the water itself; a few displayed a whitish longitudinal stripe down the back. With the view to a more particular examination of the colours at home, they were placed in a phial of sea-water, but were all dead on my arrival there a few hours afterwards. Of the many species of the more minute forms of Crustacea which I have preserved in spirits, the *Mysidæ* were always among the first to become soft and to decay. The specimens under consideration, when examined in spirits, exhibited on each segment of the body a black spot, whence more or less of an arborescent appearance was manifest.

M. Chamæleon has occurred to me much more frequently as well as in greater numbers on the Irish coast than *M. vulgaris*. In very shallow pools between tide-marks at Lahinch (Co. Clare) the latter was procured by Professor E. Forbes and myself. It frequents the tidal river Lagan at Belfast.

Genus SCORPIONURA.

S. vulgaris, Thomp., J. V,

South of Ireland.

S. longicornis, Thomp., J. V.

South of Ireland.

S. maxima, Thomp., J. V.

South of Ireland.

Genus CYNTHIA.

C. Flemingii, H. Goodsir.

Among some of the more minute Crustacea taken at Strangford Lough in May, 1840, by Mr. R. Patterson, is a *Cynthia*, but hardly sufficiently

perfect to be determined. The species on which the genus was founded was taken between Madeira and Barbadoes. Mr. H. Goodsir added the genus to the British Fauna from examples obtained on the East coast of Scotland.

Genus THEMISTO.

T. brevispinosa, Goodsir.

In September, 1835, I obtained an individual of this species in rock-pools between tide-marks at Bangor, Co. Down.

SECOND LEGION—EDRIOPHTHALMATA.

ORDER AMPHIPODA.

Genus TALITRUS.

T. locusta, Latr.

Abundant and general.

Genus ORCHESTIA.

O. littorea, Leach.

In J. V. Thompson's and Mr. Templeton's lists.

O. ———?

Bangor, Co. Down, 1835, W. T.; distinct from *O. littorea*.

Genus DEXAMINE.

D. spinosa, Leach.

Belfast and Strangford Loughs; Ballywalter; Newcastle, Co. Down.

Genus GAMMARUS.

G. locusta, Fabr.

J. V. Thompson's and Mr. Templeton's catalogues.

G. fluviatilis, Edw.

Common throughout the waters of Ireland, from North to South. I have found the stomach of the *Salmonidæ*, from Lough Neagh, often entirely filled with it. Abundant in Lough Erne.

G. marinus, Leach.

Strangford Lough, 1837, Mr. Hyndman and W. T.; Ballysodare, Co. Sligo, Mrs. Hancock.

Noticed by Leach as found on the South coast of Devonshire, and by M. Edwards on the coast of France.

G. campylops, Leach.

Taken at high-water in the tidal river Lagan, above the bridge at Belfast, May, 1836, Mr. Hyndman and W. T.

Shore of Loch-Ranza, Isle of Arran, where the species was discovered by Leach, the only locality hitherto noticed.

G. longimanus, Leach (sp.). *Mæra longimana*, Leach MSS.

A single one taken with last:—same as Leach's unique specimen in the British Museum.

G. punctatus, Johnst.,

I found in a case formed by itself among the branches of *Corallina officinalis* growing in pools between tide-marks at Springvale, Co. Down, in July, 1846. The species was determined by comparison of mine with those from Berwick presented by Dr. Johnston to the British Museum.

Genus AMPHITHÖE.

A. fucicola, Leach (sp.).

Obtained many years ago at Youghal by Dr. Ball. Leach only appears to have noticed this species: he remarks, "Habitat inter fucos in Damnoniæ australis mari rarius."

A. rubricata, Mont. (sp.).

Procured in Strangford Lough in Oct., 1839, by Mr. Hyndman and myself. In shallow rock-pools between tide-marks on the open coast at Springvale, Co. Down, I obtained several specimens in July, 1846. Previously noticed only as found on the South coast of Devon by Montagu.

Amphithöe, sp.

Bangor, Co. Down, 1835, W. T.; distinct from the preceding and *A. obtusata*, on comparison with the specimens in the British Museum.

Genus OPIS.

O. typica, Kroyer, Voy. Scandinavie et Laponie Crust., pl. 17, f. 1.

Dredged in Strangford Lough, Oct., 1839, and June, 1846; on the latter occasion picked off algæ brought up from a depth of 15 to 23 fathoms, where they grew on soft sandy ground—several specimens procured on each occasion.

Genus ANONYX.

Anonyx (Kroyer), sp.

Several specimens of an *Anonyx* of various sizes were dredged from 5 to 6 fathoms' depth—pure sandy bottom—off Bangor, Belfast Bay, in July, 1846, by Mr. Hyndman and myself. They are distinct from and more elegant in form, colour, and markings than any of the seven species—*A nanus, littoralis, ampulla, holbollii, plautus, Edwardsii, tumidus*—represented by Kroyer in such parts of the Scandinav. et Lapon. as were in the British Museum Library, in July, 1847.*

They are all plain or uniform in colour, while mine has conspicuous stellate markings; it is also of a somewhat deeper tint generally, and has the antennæ longer than any of those named.

Although a proper description cannot (on account of the state of my eyes) be drawn up, some idea may be given of this *Anonyx*—(which is well worthy of the name of *elegans*)—by the following note:—length of

* Since the above was written, Kroyer's Naturhist. Tidssk., for 1846, has come under my notice, and in it ten species of *Anonyx*, including the seven already named, are described (in *Latin*): the additional species are *A. gulosus*, *A. minutus*, and *A. Vahlii*.

body 6 lines; of upper antennæ 1 line; of lower antennæ 4 lines; general colour yellowish-pink; eyes red; lateral or abdominal plates adorned with scarlet stellate markings, of which there are five or six on those nearest the head: they become gradually fewer on those towards the tail, so that not more than one appears on the hinder plates. These markings render it very beautiful. My *Anonyx* is distinct from a British species (locality unknown) in the collection of the British Museum. As this is not included in the lately published Catalogue of the Crustacea therein contained, the present is the first notice of the genus as British.*

Genus CERAPUS.

C. falcatus, Mont. (sp.).

I agree with M. Edwards (vol. iii. p. 61) in considering the forms bearing these two names as one species: Leach looked upon them as different. Both, as distinguished by the form of the claw, are among my specimens, of which a number were dredged in Strangford Lough in Oct., 1839, by Mr. Hyndman and myself. Among the roots of a large plant of the tangle (*Laminaria digitata*) brought me from Donaghadee by Edmund Getty, Esq., in Aug., 1846, were several specimens.

Devonshire (Mont.) and the Bell Rock (Leach) are the only published localities I have seen for this species.

Genus COROPHIUM.

C. Longicorne, Latr.

J. V. Thompson's and Templeton's catalogues. Belfast and Strangford Loughs.

Genus HYPERIA.

H. galba, Mont. (sp.).

Found in the pouches of *Rhizostoma Cuvieri* on the Dublin coast in the autumn of 1838, by Mr. Hyndman.

Only noticed by Montagu as found on the South coast of Devon.

H. Latreillii, Edw.

Obtained at Youghal by Dr. Ball nearly thirty years ago ("about 1818") in great numbers in the cavities of a *Rhizostoma*. This species has not been noticed by any English author, but specimens of Leach's, marked "British coast," are in the British Museum. M. Edwards mentions it as found on the coast of France.

Genus LESTRIGONUS.

Lestrigonus, sp.

An individual of this genus is in the same phial with the last, and was obtained from the cavities of the same *Rhizostoma* with them. It has become so soft in the spirits from incipient decay as scarcely to admit of specific description. With respect to the genus, I have the opinion of Mr. Bell in addition to my own. Of the two species of this genus described, one is from India, the other from Greenland. (Edw. Hist. Crust., vol. iii. p. 82.)

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* *Anonyx*, genus ?, or rather a form between it and *Stegocephalus*, Kroyer, was dredged from a depth of 23 fathoms (shelly sand) in Belfast Bay, in Oct., 1846, by Mr. Hyndman.

Genus CHELURA.

C. terebrans, Philippi.

All that has been published on this species has already appeared in the Annals; Philippi's paper, in which it was first described, having been translated and republished in the fourth volume; and Professor Allman's, introducing it as an inhabitant of the British seas, having a place in the number for the month of June, 1847. I have therefore only to offer a few remarks bearing on the species as found at Ardrossan.

Limnoria and *Chelura* are *both* present in a piece of wood from Kingstown Pier, Dublin Bay, given me in 1842 by Dr. Ball, as well as in the wood from Ardrossan.

Both species bore in the direction of the grain of the wood, and their cells are quite alike in character: I perceive no mark of distinction when the animals are of equal breadth. The first piece of wood pierced by the *Chelura* which I had an opportunity of examining—that from Kingstown—contained the excavations of large adult individuals. The borings of these were so considerably larger than those of the *Limnoria* which had come under my notice, as to lead me to believe that the difference in the size of the aperture would at once distinguish the working of either species. The piece of wood from Ardrossan, however, not only proved that this was no criterion, but—from the circumstance of the *Chelura* being small, and less in breadth than the *Limnoriæ*—that theirs were rather the smaller cells.

Both the Crustaceans, like the *Teredo* and *Xylophaga*, labour harmoniously together in the work of destruction, and are mingled in the wood as if they were all of one species.

They can be readily distinguished from each other either when alive or dead, the *Chelura* being of a reddish, the *Limnoria* of a pale greyish yellow hue resembling that of light-coloured pine or fir. As they retain their colours after death, we may even years afterwards distinguish the two species in the excavations which they had formed in timber subjected to their ravages. From this circumstance, added to that of their burrows being formed in the closest contiguity, and many of the creatures dying in them after the timber has been removed from the sea, we may in our museums display whole catacombs of them as closely packed as ever were mummies in the best-tenanted tombs of Egypt. And the Crustaceans have this advantage, that

"Each in his narrow cell for ever laid"

remains perfect as in life, without the aid of any preservative.

On first learning from my friend Professor Allman that the two species were found associated together, I re-examined—for the purpose of ascertaining whether the *Chelura* might not have been overlooked—all the wood that I had preserved on account of *Limnoria* borings, but in none of it was the former species to be detected. This wood was all pine, and from Portpatrick, Donaghadee, and Belfast Bay: from the first-named places obtained in 1834, and from the last in the present year. In the more marine parts of this bay I was not surprised to find that the *Limnoria* existed. I had however hoped, that where the admixture of fresh with sea-water (if such take place) should be very great even at full-tide, and where at low-water the former only prevails, wood-work would be free from its attacks, but such I regret to state is not the case. For the purpose of testing this, I requested my friend Edmund Getty,

Esq. — who is officially connected with the harbour—to have all the beacons or "perches" marking the channel of the river (which they do for about two miles at the upper part of the estuary) examined, and if they proved to be injured, to favour me with specimens of the damaged wood. All this he kindly had done in the month of May, 1847, when the beacons proved to have been all attacked, and those most under the influence of the fresh-water to have suffered equally with those nearest to the open sea. The ship-carpenter, who cut the damaged portions off that were sent me, stated to my friend that some old mooring-buoys so high up as the Old Long Bridge were found on removal injured in the same manner. The *Limnoria* was the only borer of any kind found in the beacons alluded to.

It must be mentioned, that, judging from the superior size of the *Chelura* borings to those of the *Limnoria* in Dublin Bay, I had from that circumstance noted down the perforations in pieces of oak and black birch washed ashore at Belfast as the work of the *Limnoria;* but perceiving, on examination of the wood from Ardrossan, that the borings of the two species may not only be of equal size, but that those of the latter species may be the larger, I was taught that the presence of the excavator himself must be essential to settle the point, and that circumstantial evidence is insufficient. The wood in question had been so long tossed about in the sea that the animals were all washed out:—both pieces had also been bored by the *Teredo norvegica* (*T. navalis*, Turt.).

In reference to the length of time that the *Chelura* will live after being removed from its native element, the following note was made. A few specimens taken from the sea on Monday morning and received by me in the afternoon of that day were alive on Thursday morning, or seventy-two hours afterwards, when, leaving home for England, I took the piece of wood containing them with me, and on examining it next day found them dead; they had probably lived out of their native element about ninety hours. A number had lived in the same wood for about sixty-five hours; they were alive on Wednesday night at 12 o'clock, and dead on the next morning at 7 o'clock. The wood in which they were, was a small piece about six inches in length and an inch in thickness; it was not wetted since being received on Monday, and was kept in a warm room (about 65° Fahrenheit) all the time. The apparently simple fact of the species thus living so long out of water has a very important bearing, for it suggests to us that this species could, like the *Limnoria*, commit its devastations in wood left dry by the ebbing of every tide. Dr. Coldstream informs us that the latter species "often effects a lodgment in piles very near high water-mark, where it is left dry by the receding tide during the greater part of every twenty-four hours," and I have very little doubt that the *Chelura* could play a similar part. I have not heard that the extent of the damage done at Ardrossan by the destructive animals noticed in this communication has yet been estimated, but on lately writing to my obliging friend and correspondent there, requesting him to procure if possible perfect specimens of the *Xylophaga* for dissection—the testaceous portions only had before been sent—he replied that the opportunity for so doing was now past, "as the damaged portions of the dock-gates had been replaced by sound timber."

ORDER LÆMODIPODA.

Genus CAPRELLA.

C. Phasma, Latr.

South of Ireland, J. V. Thompson.

C. linearis, Latr.

Found among marine plants collected near Glenarm by Dr. Drummond, in May, 1836, and subsequently obtained in abundance by Mr. Hyndman and myself upon *Plumulariæ*, &c., dredged in Strangford Lough.

C. lobata, Müll., Kroyer.

Specimens attached to zoophytes (*Sertulariæ* chiefly) dredged from about ten fathoms on sand near Portaferry, Strangford Lough, Oct., 1839, Mr. Hyndman and W. T.

C. tuberculata, Goodsir.

Specimens taken with the last.

Guérin, in his Iconographie, &c., pl. 28, f. 1, represents a species which he calls by this name; it is from the Mauritius (Texte Descrip. Crust., p. 24).

C. acuminifera, Leach.

I found a few examples of this species living among *Corallina officinalis* in shallow rock-pools between tide-marks at Springvale, Co. Down, in July, 1846.

Genus PROTO.

P. pedatum, Leach.

North of Ireland, W. T.

Genus ÆGINA.

Æ.? longispina, Kroyer.

A single individual of this very fine, large, and spinous form was taken with the two first-noticed *Caprellæ*. My specimen differs only from that represented by Kroyer in having one or two more spines retrally on the body: it is wholly red like his, and has retained this colour in spirits to the present time. Goodsir's *Caprella spinosa* (Edin. New Phil. Journ., vol. xxxiii. p. 187, pl. 3, f. 1) approaches very near to this species, if it be not the same: it is described as having "the whole body of a pale white colour." *Caprella linearis* of authors (already recorded as Irish) was taken with this as well as *C. lobata* and *C. tuberculata*.

ORDER ISOPODA.

Genus ARCTURUS.

A. longicornis, Westwood.

North and East of Ireland.

Arcturus longicornis, West.
Leachia — Sower. (sp.).

On examination of a specimen dredged by Mr. Hyndman in July, 1851, off the Copeland Islands, in from 30 to 50 fathoms, I find it to be this species as distinguished from *Leachia intermedia*, and *L. gracilis*, Goodsir. Body of the specimen 11 lines in length. Antenna (inferior), if perfect, would be of equal length; wanting the last segment, they are 10½ lines.

Genus IDOTEA.

I. pelagica, Leach.

Dredged off Ballyhome Bay. Strangford Lough; Dundrum; Ballywalter, W. T.
Found among Derry oysters, W. T.

I. tricuspidata, Edw.

Down and Antrim, coasts and bays.
Donaghadee, 8—10 fathoms, Dr. Drummond.
Dublin Bay, Professor Allman.
Connaught; Lahinch, Co. Clare, W. T.—both littoral and dredged.
I have found it in the stomach of gulls.

I. emarginata, Edw.

Templeton's notes, "on rocks."
Dundrum, 1836, W. T.
August 26th, 1836. I should suppose that plants are as food especial favourites with this *Idotea*, as when looking over heaps of sea-weed, containing many different species, thrown among the rocks at Newcastle (in the Co. of Down), I found the *Mesogloia vermicularis* variously attacked by numbers of them, and every piece of it I saw had been more or less consumed by them. The other plants had not been touched, nor were any *Idotea* upon them. It should be stated that the *Mesogloia* did not constitute more than perhaps a 28th part of the mass of sea-weeds.

I. linearis, Edw.

Newcastle and Dundrum, W. T.
South of Ireland, J. V. Thompson.
Youghal, Dr. Ball. A specimen thence 2½ in. long, including antennæ.

I. acuminata, Leach.

Among Crustacea kindly sent from Dublin for my inspection by Dr. Ball, were two individuals of an *Idotea* 10 lines in length, very distinct in form from our three common species, the *I. pelagica*, *I. entomon*, and *I. œstrum* of Leach. They were purchased of Mr. M'Calla, but on what part of the coast taken was not stated. I mark the species with doubt on account of Leach's only specimen in the British Museum, with which they were compared, being in a bad state of preservation. The *I. acuminata* was first noticed in the British Museum Catalogue of Crustacea, p. 95 (published in 1847), as among Dr. Leach's inedited species. He obtained it on the coast of Devon, and called it in his MS., *Leptosoma lancifer*.

Genus TANAIS.

T. Dulongii, Audouin (sp.).

Two Crustaceans which I found on *Alaria esculenta* washed ashore at the Giant's Causeway in July, 1839, seem so like this species as figured in the great French work on Egypt, that I am disposed (in which Mr. Adam White agrees with me) to consider them the same. They do not exhibit any point of difference, but are not quite perfect. The second species of *Tanais* described by M. Edwards is from Naples. M. Kroyer has described three species in the Isis, one of which is from Bahia, and the other two from Madeira.

Genus LIMNORIA.

L. terebrans, Leach.

Of general occurrence.

Oct., 1846. Mr. Getty and Mr. Hyndman found one of the beacons lately put down at Garmoyle eaten by the *Limnoria*, and brought me a portion of the wood with its borers.

May 1*st*, 1848. Having heard that one of the perches or beacons in Belfast Bay (that longest down) was carried away by being struck by a vessel near Garmoyle, I examined it on being brought to the dock, and found that only about $\frac{1}{4}$ of the wood remained, where the perch had been covered by the sea at low water. The *Limnoria* alone had consumed $\frac{3}{4}$ of the wood, and many of these creatures were living in the wood when I examined it. The perch was within a month of being six years down. The wood, where eaten away, had been about 12 inches in diameter. The portion above low water-mark had not been touched. This as well as the part attacked had been smeared with tar.

Genus ASELLUS.

A. aquaticus, Oliv.

"Common in rivulets and ditches." Templeton MSS.

Genus JAERA.

J. albifrons, Mont. (sp.).

Common under stones in shallow rock-pools between tide-marks at Bangor, Belfast Bay (1834, W. T.), and in Strangford Lough, both strictly marine localities; also obtained in the tidal river Lagan, at Belfast. Known only hitherto as found on the coast of Great Britain.

Genus ONISCUS.

O. asellus, Linn.

"Common among rotting timber." Templeton MSS.
South of Ireland, J. V. Thompson.

Genus LYGIA.

L. oceanica, Fabr.

Of general occurrence.

Nov., 1847. Mr. Darragh tells me is very common on the beach at Ballymacarrett (Belfast), and very often entered and ran about the floor of his house, the back of which rises direct from the beach.

Genus PHILOSCIA.

P. muscorum, Latr.

South of Ireland, J. V. Thompson.

Genus PORCELLIO.

P. scaber, Latr.

"Common under stones, wood, and in old walls." Templeton MSS.

P. lævis, Latr.

"Rare; I have only seen one specimen." Templeton.

Genus ARMADILLIUM.

A. vulgare, Edw.

J. V. Thompson, catalogue. "Inhabits among stones and moss." Templeton.

Genus PRANIZA.

P. cærulata, Mont. (sp.)?

A letter from A. H. Haliday, Esq., dated October 9th, 1847, conveyed the following information:—"I found a species of *Praniza* pretty common on the clayey shores of Strangford Lough last week, in company with *Anceus maxillaris*. They were in small cavities on the surface of the clay under stones, sometimes singly, oftener two or even three and four in each hole; the smaller slender green ones were few in comparison. You will find some of the new-born young with them, having all the characteristic form of the parent, but the posterior thoracic segments not so completely confounded together. I have given but a hasty look at them, but have not recognised males among the adults."

Along with Crustacea since received from Dr. Ball, were sent specimens of a *Praniza*, purchased of Mr. M'Calla as collected on the Irish coast, but no locality is given. They were obtained previous to those first noticed.

M. Edw., vol. iii. 195, remarks that the male is found on the rocks of the coast of La Manche and England, and the female appears to live habitually fixed to the branchia of various fishes; I have never seen them on deep-water fishes, though they may infest the littoral species, as *Father-lasher*, &c.

Genus ANCEUS.

A. maxillaris, Lann.

I obtained specimens dredged with *Modiola vulgaris* at Bangor in Sept., 1835, one from the rejectamenta brought with lobsters from Glenarm, Dec., 1843, and two or three brought with oysters from Stranraer (Scotland), also on oysters from Bangor, Down.

Genus SPHŒROMA.

S. serratum, Leach.

River Lagan and Strangford Lough, W. T.

S. Hookeri, Leach.

South of Ireland. J. V. Thompson.

S. rugicauda, Leach.

North of Ireland, W. T.

S. Prideauxiana, Leach.

An example of this species, taken in a towing-net where the water was several fathoms in depth in Belfast Bay in August, 1846, by Mr. R. Patterson, was brought to me alive. Its colour was pale brown with dark brown markings; its motions when undisturbed were lively; when touched, it rolled itself into a ball.

My specimen, which on comparison with the original one from "Devon" (where only it has yet been noticed) in the British Museum, must be considered this species, at the same time cannot be said to differ from *S. curtum* (a view in which Mr. Adam White coincides);—it is intermediate in size, form, &c., between the individual examples of the two species in that collection. M. Edwards offers some remarks on the difficulty of distinguishing *S. curtum* from Leach's description (Hist. Crust., vol. iii. p. 209).

S. Griffithsii, Leach MSS.? Brit. Museum Catal., p. 103.

Three *Sphæromæ* obtained in Belfast Bay and Strangford Lough (1835, &c.) are similar to the two poor original specimens from Torbay, so named in the British Museum, excepting in the caudal plate being rather more rounded in my specimens.

Genus CYMODOCEA.

C. truncata, Mont. (sp.).

Two examples procured between tide-marks at Cultra and Rockport, Belfast Bay, Mr. Hyndman and W. T., 1837. Leach remarks that the species is found amongst *Fuci*, and is very rare: Edin. Ency., vii. 433. Mine agree with his specimen in the British Museum; it is from Devon (the only known locality).

Genus DYNAMENA.

D. rubra, Leach.

This species was determined from comparison with Dr. Leach's specimens in the British Museum.—Not uncommon on the North-East coast.

Genus NESÆA.

N. bidentata, Desm.

"North of Ireland." Templeton.

Genus CIROLANA.

C. hirtipes, Edw.

My specimens are similar to those so named in the British Museum (but whence these were obtained is unknown), and agree with the description and figure of M. Edwards, whose only locality indicated for the species is the Cape of Good Hope! The first individuals which came under my notice were found in the midst of a mass of boiled cod-fish ova sent me from Portpatrick about ten years since, by Lieut. Little, R. N. In September, 1841, several found adhering to a skate (*Raia batis*) taken in Belfast Bay, were brought to me by Mr. Hyndman. I have also procured it on the gills, and once alive in the stomach of a holibut (*Hippoglossus*), from the last-named locality. It was enumerated in my Report under the name of *Cirolana Cranchii*, the only known British form of the genus.

Genus EURYDICE.

E. pulchra, Leach.

This pretty species has been taken at Larne by Mr. R. Patterson (1838), and at Carrickfergus, between tide-marks, by Mr. Hyndman (March and April). Bantham, Devon, the original locality (Leach, Linn. Trans., xi. 370), appears to be the only one yet noticed for *E. pulchra*.

Genus ÆGA.

Æ. bicarinata, Leach.

March 30, 1839. I procured an individual of this species alive in Belfast market, whither it was brought with oysters from Carrickfergus. It was not known to Dr. Leach whence the specimen was brought that served for his description, and the works accessible to me in which the species is introduced do not contain any information as to its habitat.

Æ. tridens, Leach.

North of Ireland.

Genus BOPYRUS.

B. squillarum, Latr.

A *Palæmon serratus*, taken by Dr. Ball at the South Islands of Arran, off the coast of Clare, in June, 1835, contained within the plates of the head a fine specimen of this *Bopyrus*, 6½ lines in length, and agreeing with the female as represented by Desmarest and other authors.

B. hyppolytes, Kroyer.

Two females of this species were found within the carapace of the *Hippolyte varians*, Leach, which I obtained on the coast of Galway in July, 1840. M. Kroyer found it on the *Hippolyte polaris*.

B. galatea, Thompson.

South of Ireland, J. V. Thompson MSS. West of Ireland, Dr. Ball.

THIRD LEGION—BRANCHIOPODA.

ORDER PHYLLOPODA.

Genus APUS.

A. cancriformis, Latr.

North of Ireland "in stagnant waters." Templeton MSS.

Genus BRANCHIPUS.

B. stagnalis, Latr.

"In a pond along with *Daphnia pulex*." Templeton MSS.

Genus NEBALIA.

N. bipes, Fabr.

Clifden and Roundstone.

ORDER CLADOCERA.

Genus DAPHNIA.

D. pulex, Müll.

"Pond at Cranmore." Templeton MSS.

D. longispina, Müll.

"Pond at Cranmore." Templeton MSS.

Genus SIDA.

S. crystallina, Edw.

Professor Allman lately sent me sketches of a *Daphnia* obtained by him during autumn in a little subalpine lake near Killarney, where it was in profusion adhering to the under sides of the leaves of the water-lily (*Nymphæa alba*). On the sketches being transmitted to Dr. Baird of the British Museum, he at once recognised in them the *D. crystallina*, Müll. (*sida*, Straus), adding that he had met with the species but in two localities—near London—and in both sparingly.

Genus LYNCEUS.

P. lamellatus, Müll. *Eurycercus lamellatus*, Baird.

Taken in Lough Neagh at the beginning of August, by Mr. A. H. Haliday and W. T.

Genus POLYPHEMUS.

P. oculus, Müll.

North of Ireland "in marshes and drains, very rare." Templeton MSS.

FOURTH LEGION—ENTOMOSTRACA.

ORDER OSTRAPODA.

Genus CYPRIS.

C. conchacea, Desm.

North of Ireland, Templeton MSS. Clifden, Mr. Haliday.

C. candida, Desm.

Clifden, Mr. Haliday.

C. reptans, Baird.

Taken with last; together with a species of *Daphnia*, believed by Dr. Baird to be undescribed; the *Lynceus* and *Cypris* were named by this gentleman; the specimen of the latter, being in a bad state, was marked with a note of doubt.

Genus CYTHEREA.

C. viridis, Latr.

"Among *Fuci* at Bangor and Macedon Point, in Belfast Bay." Mr. Templeton.

C. lutea, Latr.

"Among *Fuci* at Bangor." Mr. Templeton.

ORDER COPEPODA.

Genus CYCLOPS.

C. quadricornis, Latr.

"In the drains at the Moss, Cranmore." Mr. Templeton. Has also been found by Mr. Haliday about Belfast.

C. longicornis, Müll.

"In drains at the point-fields, Belfast." * Mr. Templeton.

Genus CYCLOPSINA.

C. staphylinus, Edw.

Early in the spring in the drains of Cranmore, Mr. Templeton. Clifden, Mr. Haliday.

Genus ANOMALOCERA.†

A. Pattersonii, Templeton.

Larne Lough, Mr. Patterson.

Genus CETOCHILUS.

C. septentrionalis, Goodsir, Edin. New Phil. Journ., vol. xxxv. p. 336, pl. 6, f. 1—11.

Many of this species were taken with the last in May, 1840, in Strangford Lough, by Mr. Patterson:—in October, 1843, this *Cetochilus* was described by Mr. Goodsir.

Genus CANTHOCARPUS.

C. minuticornis, Müll. (sp.).

Obtained in Strangford Lough, Oct., 1839, Mr. Hyndman and W. T.

Genus NOTODELPHYS.

N. ascidicola, Allman.

On the Irish coasts, swimming freely in the branchial sac of *Ascidia communis*. Professor Allman, Proc. Ro. Irish Academy, April, 1847, Dec., 1847. From two *Ascidia mentula*? about 1 inch in length each (taken in Belfast Bay, Aug. 25, 1840, E. Getty), and preserved on account of the parasite, I took to-day 25 specimens of it, and more may still remain within the tunics.

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* Another of this genus, without specific name, appears in the Report and MSS., no locality mentioned.—ED.

† Dr. Baird considers these genus synonymous with *Pontia*, Edw. W. T.

ORDER SIPHONOSTOMATA.

Genus ARGULUS.

A. foliaceus, Jurine.

Belfast, Oct. 29, 1838.—In our market to-day I had the pleasure of detecting one of these very interesting and handsome parasites attached to the dorsal fin of a *Salmo Trutta*, about a foot in length. The *Argulus* is 3½ lines long, is a female, and in addition to the ova exhibits at the base of the tail the dark green spots ("noirs," Desm. Consid. Gen. Crust., p. 332) which are considered to mark this sex. Although the fish to which it was attached had been for some hours out of the water, the *Argulus* held so firmly by its two disks that I had some difficulty in detaching it without injury. For about ten minutes it was wrapped in a piece of dry paper, and then placed in a vessel of water in which salt had been dissolved until it was to the taste like strong sea-water.* This was no sooner done than my pretty captive, after drawing her last pair of feet together several times,† thus calling to mind the common housefly, struck out her oars, and thereby was rapidly impelled through the fluid.

The figures of Desmarest (tab. 50) and Yarrell (Brit. Fish., vol. ii. p. 399) are very characteristic of this species, but the great beauty exhibited in the specimen before me is at the same time not shown, perhaps in consequence of the upper side of the female not being represented—this consists in its being closely spotted with very dark green along the central part of the body for two-thirds posteriorly, commencing a little above the ovary in the form of a head, and extending to the posterior portion; the rest of the upper side of the body being of a very pale yellowish green hue and semi-transparent as described, the part thus spotted is well defined, and is strikingly of the form of a coleopterous insect, which the *Argulus* in another point of view resembles, when the two sides of the greenishly transparent "boucliers" are thrown a little apart, as we see the elytra of the insect. I was further reminded of the resemblance when attempting to remove it, as in holding firmly by the suckers, the body was drawn in, and the "boucliers" elevated quite above it. Its motion through the water seems equally rapid, whether it be on the upper or under side, or swimming retrally—it frequently moved along the surface with its back downwards, and was wholly immersed except the suckers, which were thrown either on a line with the water or quite above it, and thus would the animal occasionally remain quiescent for a short period.

The constant motion of these organs (visible to the naked eye) in addition to the rapid play of the feet, impart much life to the appearance of the *Argulus*, and present not the same aspect for two continuous seconds of time, whether the body be at rest or otherwise. They—i. e. the marginal row of minute suckers, which appear as a dark line round the disk in figures of the species—are frequently drawn together to the centre of the disk, exhibiting a dark point not larger than the eye.

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* This was done in consequence of my having been told that the fish was taken in the sea; the stomach, however, contained the remains of fresh-water insects (according to my friend A. H. Haliday, Esq., to whose inspection they were submitted), which possibly might have been washed into the sea and there obtained, but this is by no means probable.

† I observed this repeatedly done afterwards—they seem to be rubbed against the caudal plates.

The eye itself, under the lens or microscope, exhibits constant motion, and even to our unassisted vision its red colour—that of the lady-bird, *Coccinella septempunctata* — is apparent ; when magnified it looks black where the lines and dots are, red elsewhere.

After having been about four or five hours in the salt water, and displaying its wonted activity to the last, the specimen was lost during my absence from the room. I had intended to observe how long it—a fresh-water species—would live in salt water, but though foiled in this, have thought these notes, made with the living animal before me, might perhaps be worth the room they occupy, more especially as the *Argulus* seems to be very little known as a British species. From what has been stated it would seem to be very tenacious of life. The individual here treated of is the second Irish one I have seen; the other was, when swimming freely in Lough Neagh, taken by Mr. Hyndman in the autumn a few years since. Like the present specimen, it displayed a mass of large ova.

Genus CALIGUS.

C. Mülleri, Leach.

" North of Ireland," Mr. Templeton.

C. salaris? J. V. Thomp.

" South of Ireland," J. V. Thompson.

C. scombri, J. V. Thomp.

" South of Ireland," J. V. Thompson.

C. productus, Müll.

" North of Ireland," Mr. Templeton.
Belfast Bay, W. T.

C. minutus, Otto.

I obtained a specimen off a holibut in Belfast market in February, 1837. It differs very little—hardly in species—from *C. hippoglossi*, Kroyer, Tidssk. bind i. p. 625, pl. 6, f. 3 (1st series).

M. Edwards notes the species as found on the coast of Bretagne in the branchial cavity of the " Bass " [Basse. *Labrax lupus*, Cuv.].

C. diaphanus, Nordm.

Nordmann obtained this species off *Trigla hirundo*. I have procured it not only on that fish but on the following, purchased in Belfast market : —*Trigla pini*, *Pagellus centrodontus*, *Scomber scombrus*, *Caranx trachurus*, *Merlangus carbonarius*, *Merlucius vulgaris*, *Lota molva*, *Platessa vulgaris*, and *Pleuronectes maximus*. The specimens were taken in March, August, October, and December (1837).

C. Stromii, Baird,

I have found on *Salmo trutta* taken in Dundrum Bay (Co. Down), Aug., 1836, and on the same species captured in the sea at Donaghadee in March ; on *Salmo eriox* from the latter locality in Dec. ; on *Salmo salar* taken on ascending two of the Co. Antrim rivers from the sea in June

and July. M. Edwards indicates this species merely as found in the gills of a salmon. *C. vespa* was noticed this year for the first time as found on the English coast. See British Museum Crust., p. 118.

C. curtus, Kroyer.

On *Raia maculata* taken in Belfast Bay, April, 1839, W. T.

C. rapax, Edw.

C. sturionis, Kroyer,

I obtained on *Trigla hirundo* and *T. pini* brought to Belfast market in November, 1839.

C. Nordmanni, Edw.

I took several specimens of this fine *Caligus* alive on a sun-fish (*Orthagoriscus mola*) captured on the coast of Antrim in September, 1848. They were all adherent externally to the skin of the fish on different parts of the body. When living they were marbled over with greyish lilac of dark and light shades. This species was erroneously included in a paper published in the 20th vol. of the Annals, p. 248. The name *C. Müller*i being substituted there for *C. Nordmanni* will make all correct. Two others noticed in the same page require the following correction, according to Dr. Baird, who then kindly assisted in determining them, but has since given the subject a more rigid examination.

C. pectoralis, Kroyer.

M. Edwards notices this as found on turbot, plaice, and other flat-fishes (vol. iii. p. 454). I have procured it on *Platessa flesus*, *P. limanda*, *Solea vulgaris*, *Scomber scombrus*, *Zeus faber*, and *Conger vulgaris*, brought to Belfast market in March, 1837: they adhered to all the exposed parts of the body of the various fishes, and not to the gills, &c.

Genus TREBIUS.

T. caudatus, Kroyer.

This truly generic form was obtained by Kroyer on a *Squalus galeus* taken in the Kattegat. My specimens—both male and female—were found adhering externally over both sides of the body of a *Raia batis* captured in Belfast Bay in September, 1838.

Genus CECROPS.

C. Latreilleii, Leach.

South of Ireland, J. V. Thompson.
On *Orthagoriscus Mola*, taken at Dublin, Dr. Ball. Cork, Prof. Allman.
On the same from Antrim coast.*

Genus DICHELESTION.

D. sturionis, Edw.

South of Ireland, J. V. Thompson.

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* On *Orthagoriscus Mola*, Belfast Bay, 1852.—Ed.

ORDER LERNEADA.

Genus LERNEA.

L. uncinata, Müll.,

I obtained on the gills of a *Gadus callarias*, taken at Larne (County Antrim) in the summer of 1834. By Dr. Bellingham of Dublin I have been favoured with specimens, which he found attached to the gills of whiting (*Merlangus vulgaris*) brought to the market of the metropolis.

In 1846, Dr. Drummond found it at Holywood, attached to the base of the pectoral fin of a small codling.

Genus CHONDRACANTHUS.

C. cornutus, Edw.

To Dr. Bellingham I am indebted for specimens of this, which were found by him attached to the gills of sole, purchased in Dublin market in May, 1837.

C. Lophii, Johnst. Mag. Nat. Hist., vol. ix. p. 81, f. 16.

The first specimens which I have seen were procured by Dr. Scouler on a *Lophius piscatorius* in Dublin; more recently they occurred to myself, in the pouches of a fish of the same species brought to that city.

C. gibbosus, Kroyer.

Taken in the pouches of a *Lophius piscatorius* in Dublin, December, 1839 (W. T.), and from pouches of three individuals captured in Belfast Bay, November, 1841. M. Edwards brings this species with doubt under *C. Delarochiana* (Cuv. Règ. Anim.), which has been found on the tunny, *Thynnus vulgaris*. *C. Lophii*, Johnston, Loudon's Mag. Nat. Hist., ix. 81, f. 16, already recorded, seems to me identical with *C. gibbosus*, Kroyer.

Genus ENTOMODA.

E. canicula, Thomp. J. V.

"South of Ireland," J. V. T.

E. puella, Thomp. J. V.

"South of Ireland," J. V. T.

Genus BRACHIELLA.

B. salmonea, Templeton.

"North of Ireland," Mr. Templeton.

Genus LERNEOPODA.

L. galei, Kroyer,

Was found by its describer on the fin of a *Squalus galeus*, Linn.; on which species, from Belfast Bay, I likewise obtained my specimen in December, 1839:—it was adherent to the cavity posterior to the vent of the fish.

Genus LERNEONEMA.

L. monillaris, Edw.

This species has been favoured me by Dr. Ball, who procured specimens adhering to the sprat (*Clupea Sprattus*) at Youghal. Dr. Ball remarks that when alive it is of a beautiful green colour, and generally adheres to the cornea of the fish's eye: one of those sent to me is fixed to the body of the sprat close to the dorsal fin.

Genus LERNEA.

L. branchialis, Kroyer.

Gills of the cod. Belfast Bay, 1844 and 1848, W. T.; and Dublin, Mr. Glennon.

ORDER PYCHNOGONIDA.

Genus NYMPHON.

N. gracile, Leach.

Shores of Antrim and Down, W. T.

N. grossipes, Linn.

"North of Ireland," Mr. Templeton.

N. Johnstoni, Goodsir.

The first specimen of this *Nymphon* which I have seen was taken by Dr. J. L. Drummond at Macedon Point, Belfast Bay, upwards of twenty years ago. From 1834 to the present time I have occasionally procured it on the North-East coast.

N. spinosum, Goodsir.

Examples of this species have been taken in Belfast Bay, &c.

N. femoratum, Leach.

Dredged from eight to ten fathoms at Donaghadee in May, 1843, by Dr. J. L. Drummond.

Leach only is quoted by M. Edwards, vol. iii. p. 534, for this species, who notes it however as inhabiting "La Manche."

Genus ORYTHIA.

O. coccinea, Johnst.

Portaferry, Strangford Lough, 1837, Mr. Hyndman and W. T.

Genus PHOXICHILIDIUM.

P. globosum, Goodsir,

I obtained among zoophytes thrown ashore at Portmarnock, on the Dublin coast, in Aug., 1840. This species was only known to its describer as taken in Orkney by Prof. Forbes and Prof. Goodsir.

Genus MUNNA.

M. Kroyeri, Goodsir.

Taken in a towing-net on the surface of Strangford Lough in May, 1840, by Mr. R. Patterson.

The genus *Munna* was described by Kroyer in 1841, and Mr. Goodsir's *M. Kroyeri* was obtained in July, 1842, in the Firth of Forth.

Genus PASITHOE.

P. vesiculosa, Goodsir.

My specimen of this rare form was dredged at Dalkey island, Bay of Dublin, in August, 1840, R. Ball, E. Forbes, W. T. Mr. Goodsir's was procured in the Firth of Forth.

Genus PYCHNOGONUM.

P. balænarum, Fabr.

This common species was accidentally omitted in former "Additions to the Fauna of Ireland." *Pyc. balænarum* must on our coast be content with a smaller victim than a whale, and condescends to suck the juices of an *Actinia*. In January, 1834, several of these parasites, from a very minute to a middle size, were found upon the *Actinia mesembryanthemum* at Bangor by Mr. Hyndman and myself: on the shore near Dublin, the *Pychnogonum* has likewise been taken on *Actinia* by Dr. Bellingham. Specimens from Ballintrae, Ayrshire, and Whitehaven, Cumberland, are in my collection: among oysters brought from the latter place to Belfast, I have found them particularly numerous.

CIRRIPEDA.

I. PEDUNCULATA.

Genus ANATIFA.

A. lævis, Lam.

Drift timber, Tory Island, Mr. Hyndman. Belfast Bay, W. T. Dundalk, Mr. Hyndman. Cork Harbour, Mr. Humphreys. Bundoran, Mr. Hyndman.

A. dentata, Lam.

A specimen of this *Anatifa* from Magilligan, County Londonderry, is in Mr. Hyndman's collection. It presents every character of *A. lævis*, Lam., except in the dorsal valve being slightly dentate—a character insufficient in my opinion to constitute a specific difference. Of 200 specimens examined in 1847, only 12 were dentate. The peduncle of all was of a very dark brown colour.

A. striata, Lam.

Magilligan and Portstewart, Mr. Hyndman. Dublin Bay, Dr. Ball. Cork Harbour, Mr. Humphreys. West of Ireland, Mrs. Hancock. Said to be densely clustered over bark of a pine found floating off Waterford, and presented to the Dublin Nat. Hist. Soc. in 1848, by Dr. Farran.

A. vitrea, Lam.

In 1831, Mr. Hyndman found *vitrea*, attached to *Fucus vesiculosus*, and *F. nodosus*, thrown ashore (and quite fresh) at Magilligan and Portstewart, and subsequently found it on both species at the Giant's Causeway, as well as on feathers of sea-fowl.

Dr. Ball, in letter of December 14th, 1844, mentions having got his *Anatifa* on *Halidrys siliquosa* in 1819, about a mile from Youghal.

Dr. Farran, in a paper read to the Dublin Nat. Hist. Soc. in Dec., 1844, and published in Saunders' News-letter of Dec. 12th, mentions his finding, at Roundstone Bay, *A. vitrea* adhering abundantly to *F. vesiculosus*. Mr. M'Coy, in his remarks on the paper, mentioned that Mr. Warren in 1838 presented this *Anatifa* to the Soc., attached to *F. vesiculosus* gathered on our shores.

A. sulcata, Lam.

Of this beautiful striated species, I saw two groups attached to cork-wood found at Killiney, in Mr. Warren's collection.

"Found on the shores of the Atlantic, by Mr. O'Kelly."

"Found by Mr. O'Kelly, near Kenmare harbour in Ireland, on a piece

of oak bark," Turt. C. D. Youghal, Dr. Ball in Proc. R. I. A., p. 32. Cork Harbour, Mr. Humphreys; Milton Malbay, Professor Harvey.

Dr. Ball obtained it many years ago at Youghal.

Cirripeda, noted on western tour of 1840.

Ballyshannon, July 15th. A. vitrea, on *F. nodosus*, thrown ashore. Next day we found it thrown ashore abundantly at Bundoran; it was in a young state, and on feathers. Mrs. Hancock has a piece of the bark of a tree thrown ashore at Bundoran, covered with *A. vitrea*, with the addition of *A. striata*. *A. lævis* (common barnacle) in some quantity on the beach at Bundoran.

Genus SCALPELLUM.

S. vulgare, Leach.

Dredged in Belfast Bay, adhering to *Tubularia indivisa*, G. C. H. and W. T.

In a fishing boat at Carrickfergus, G. C. H.*

April 3rd, 1848. Two specimens attached to a stem of *Antennularia antennina* (var. *ramosa*), dredged from 5 fathoms in Belfast Bay to-day by Mr. E. Getty, and shown to me.

January, 1848. *S. vulgare*, two specimens attached to *Antennularia*, found amongst oysters, from Groomsport, Dublin coast, T. W. Warren's collection, on *Tubularia indivisa*. Dublin Bay, Professor Harvey, Dr. Ball in Proc. R. I. A., p. 32.

Genus POLLICIPES.

P. cornucopiæ, Leach; *Lepas pollicipes*, Gmel.

Mr. Warren of Dublin informs me that he once saw fresh specimens brought to Mr. Glennon's shop, and which were stated by the person in whose possession they were to have been found in the taking down of a lock for repairs at Ringsend, Dublin.

Genus CINERAS.

C. vittata, Leach.

On the bottoms of vessels from foreign localities (once or twice) in Belfast, and on wood washed ashore at Larne, G. C. H. Several specimens quite fresh brought to G. C. H., by one of the fish-carriers in Belfast market, who stated that he picked them off oysters from Malahide. They were shorter in the peduncle than those obtained from the bottoms of vessels by G. C. H. Attached with an *Otion* to a *Balanus*, Dr. Ball, in Proc. R. I. A., p. 32, 1836-37.

Genus OTION.

O. Cuvieri, Leach.

The remarks on *Cineras* apply also to this; they are usually associated.

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* Dredged in Strangford Lough, April, 1852, by Mr. Hyndman and Ed.

be this form, as I also do specimens enveloped in *Alcyonium* found on the Woodstown strand, Co. Waterford, by Dr. Farran. I find among my dried specimens collected at Bangor, in September, 1835, *B. Alcyonii* imbedded in *Alcyonidium* adherent to *Fucus nodosus*.

The following forms or species seem to be taken at particular depths. I write from memory:—

1. *B. punctatus*, Mont. (abundant N. and E.). Littoral (see Down Notes, 1846).

This species only littoral on such parts of coast as looked to.

2. *B. ovularis*. Laminarian region, and shallower often on *Laminaria*. (Not uncommon, N. and E.)

3. *B. costatus*. Laminarian region. On *Laminaria*, on *Pinnæ*. (Not common, N. E.)

4. *B. rugosus*, as figured in Brown's Illustrations. Between littoral and Laminarian region. (Common, N. E.)

5. *B. Communis*. Moderate depths, on oysters. Dredged 10 or 12 to 15 fathoms, Belfast Bay.

6. *B. Scoticus*. On *Modiolus vulgaris* and shells of many kinds. (Common, N. E.)

Sept., 1847.—This is the species dredged from 20 fathoms, Belfast Bay, G. C. H.

Genus ADNA.

A. Anglica, Leach.

Three dead specimens were obtained on fragments of *Caryophyllia* from rocky ground east of Cape Clear, 40 to 50 fathoms, by Mr. M'Andrew.

Genus CREUSIA.

C. verruca, Leach.

On wood floating in sea; on crabs, &c., as well as shells, Down and Antrim coasts. On *Pinnæ* taken inside and outside Cork Harbour, Cork Fauna. Youghal, Dr. Ball.

Genus CORONULA.

C. diadema.

I saw in Mr. Warren's collection one, said to have been taken off a whale at Howth many years ago. March, 1847, W. T.

base of the rocks, thus reminding one of coral islands. No other species is anywhere (that I looked) intermixed with it.

Springvale, Down, July 16, 1846, W. T.

None are found far up the Belfast estuary, where the water is brackish.

April 29th, 1840.

B. punctatus, Mont. Every object on the beach at Craigavad, Belfast Bay, was profusely covered with the young of this species (or what I consider as such) wherever they could remain stationary, as for instance in the furrows of the clam-shell (*Pecten maximus*), though on the elevated ridges none rested. They were so young (1-20th of an inch in length) as to give a beautifully beaded appearance to the furrows of this shell. I have similarly remarked them in the spring of the year covering over every object on the beach at the island of Ireland's Eye, on the coast of Dublin. The young as noted here on April 19, 1835, is the *Lepas convexula*, Penn. I subsequently saw that Dr. Johnston was also of that opinion (Berwick Club Proceedings).

B. punctatus, April 14, 1848.

I brought some on stones and limpets here from Cultra, for the purpose of keeping them until they would produce young. From the first day I brought them home—in a large botanical box packed in wet *Fuci*—they threw off the shuttlecock-like exuviæ in quantity, but these only during the first week.

Sept. 29th, 1848.

I examined a great number of *Balani* this evening, in reference to the growth made by them during the present season, and found it to average 3 lines diameter at base—the largest 4 lines. I saw a few minute ones only 1 line in diameter, implying that the species continued to breed until lately; these were not more, probably, than four weeks old. The young of the year are *indelibly marked* from the older ones, by their pure whiteness and fresh appearance. Judging from the size of this year's specimens, and of the older on the same stone, I am of opinion that the term of life of the species is two years; but another year's examination (if I live myself) will enable that point to be determined. Nearly all the adults on the rocks from which Mr. Darragh* and I took specimens in spring are dead, with the valves washed away, and the outer shell only remaining. This is the case with 9-10ths of the adults which I saw living on the shore here in spring.

July 3rd, 1848.

I measured several *Balani* on a large stone, with the view of ascertaining their rate of growth.

Sept. 30th, 1848.

Those of 2½ lines diameter and upwards then, were now 4¼, the maximum size of the species on the stones examined to-day.

B. fistulosus, Lam.

Magilligan and Dundalk, Mr. Hyndman.
Rocks below Bantry Bay, rare, Turt. Cat.
Cork Harbour, Mr. Humphreys.

B. Alcyonii, Turt. (sp.),

Balani adherent to the tube of an *annelid* (*Syllis armillaris*?) dredged off St. John's Point, Co. Down, 15 fathoms, by Mr. Hyndman, I take to

* The Curator, Belfast Museum.—Ed.

be this form, as I also do specimens enveloped in *Alcyonium* found on the Woodstown strand, Co. Waterford, by Dr. Farran. I find among my dried specimens collected at Bangor, in September, 1835, *B. Alcyonii* imbedded in *Alcyonidium* adherent to *Fucus nodosus*.

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ANNELIDA.

ORDER I.—APODA.

TRIBE NEMERTINA.

Genus GORDIUS.

G. aquaticus, Linn.

North of Ireland, W. T. East, West, and South, R. Ball.

Genus BORLASIA.

B. alba, Thompson.

Dec. 18, 1843.—Two worms, apparently of the genus *Borlasia* (Johnston, Mag. Zool. and Bot., vol. i. p. 536) and of the same species, were found on the beach a short way northward of Carrickfergus by Mr. Hyndman and myself. They were lurking under stones between tide-marks. The species may be described as new, under the name of *Borlasia alba*:—of a whitish colour throughout, excepting behind the eyes on each side, where a reddish spot appears: eyes fourteen; the first four on each side near the margin of the body disposed in a line, and at equal distances from each other; considerably behind them are three at each side disposed in a triangular manner, the base towards the head of the worm: entire length 2 inches when stretched out so that its breadth is 1 line or 1-12th of an inch.

The annexed outline shows the position of the eyes.

1. Reddish spots.

B. octoculata, Johnst.

A few specimens agreeing in size and all the characters with the description and figures were obtained with the last. Cultra, 1848, W. T.

B. purpurea, Johnst.

This species, differing little from the last in any external character but that of colour, was procured at the same time, but was much more numerous. Several specimens of this and the other species of the same family here noticed were kept alive for three weeks in a phial of sea-water, and thus afforded ample opportunity for observation. The water was not changed during that period, but the length of time that they would have lived under such circumstances was not ascertained, in consequence of my leaving home. The individuals of this species were about 3 inches in length and perfectly agreed with the description and figures; some had only six, and others eight eyes as stated by Dr. Johnston.

B. olivacea, Johnst.

A worm agreeing in all characters of form and colour with this—having four eyes, and marked with red over the site of the heart; characters

specially named as they are apparently not constant—was procured between tide-marks in July, 1846, at Bangor, Downshire, by Mr. Hyndman and myself. A specimen agreeing with this, except in having eight eyes, was taken with the species noticed as obtained at Strangford Lough in June, but, judging from zoological characters only, I could not think that it was distinct from *B. purpurea*.

Genus LINEUS.

L. longissimus, Sow.

Capt. Fayrer got an individual of this species, holding on to a bait (the "buckie," *Buccinum undatum*, Linn.) on his long line, when he was fishing for cod, off Portpatrick. Having put it in spirits, diluted with an equal portion of water, Capt. F. observes "that the contortions of the poor animal were really horrible." Montagu mentions, that one about 8 feet long, which he put alive into spirits, instantly contracted to about 1 foot, at the same time increasing to double the bulk, which originally was about the diameter of a crow-quill," Linn. Trans., vol. vii. p. 73. Judging from this, the present specimen must have been very much larger, as in its present contracted state it is about 3 feet in length, and from 1½ to 3½ lines in diameter. Its colour is, as described by the author just quoted, "dusky brown, with a tinge of green, with five [several] faint longitudinal lines, of a paler colour."

A few years ago, a specimen of the *Nemertes*, about 12 feet in length, was taken on the opposite coast of Ireland, near the entrance of Strangford Lough, by my friend, Mr. Hyndman: in this instance it was found sheltered beneath a stone, at low water. This remarkable worm, the only species of the genus I believe yet discovered, has three generic appellations attached to it; being the *Lineus* of Sowerby, the *Borlasia* of Oken, and the *Nemertes* of Cuvier. Also taken at Killybegs (6 feet in length before being placed in spirits), sent me thence by Mrs. Atherton, W. T. Dalkey; Clifden, Dr. Ball.

Genus MECKELIA.

M. trilineata, Johnst.

This beautiful worm has been dredged by Mr. Hyndman and myself on different occasions in Strangford Lough, and in the open sea at Ballywalter on the Down coast; in every instance it was *free*.

Belfast Bay, Dr. Drummond.

Genus PROSTOMA.

P. gracilis, Johnst.

I received a specimen of this worm taken at Cultra, Belfast Bay. It is larger than Dr. Johnston's, but agrees in every character with his description and figure.

P. lactiflorea, Johnst.

With the last species, two examples of this were procured. The eyes are as described by Dr. Johnston, and consequently the worm would seem to be distinct from *Planaria rosea*, Müll. My specimens when extended are each about two inches in length and of a yellowish flesh colour. The characters are all as given by Dr. Johnston.

Found also at Bangor, July, 1846.

P. melanocephala, Johnst.

Under stones resting on a rich oozy sand between tide-marks at Gull Island, Strangford Lough, two of this species were obtained in June by Mr. Hyndman and myself. Both were of a pale yellow colour; the one ½ an inch, the other 1 inch in length; they agreed in every respect with the description and figures given in Mag. Zool. and Bot., vol. i. p. 535, pl. 17, fig. 5.

P. armata, Templeton.

North of Ireland, Mr. Templeton.

Genus PLANARIA.

P. cornuta, Müll., Zool. Dan.; Johnston, Mag. Nat. Hist., vol. v. p. 344.

Aug. 26, 1844.—Mr. Hyndman dredging to-day off Castle Chichester, just within the entrance of Belfast Bay, and at a depth of from 6 to 10 fathoms, took three specimens on *Laminariæ*. Although the figures of this *Planaria* in the works cited differ a good deal, I agree with Dr. Johnston in believing them to represent the same species. The Irish specimens as observed at various times were more round in outline than Dr. Johnston's figures, and consequently quite different from those of Müller in that respect. The network of reddish "vein-like ramifications" on a cream-coloured ground renders this *Planaria* viewed as a whole very beautiful; the multitude of dot-like black eyes on a rich white ground looked very elegant from the contrast of the white to the general reddish hue of the animal. Its progress, as Dr. Johnston remarks, "for a worm" is not slow: the tentacula were always reflected backwards so as not to be visible in a profile view. The species has been already so fully described that further observations are unnecessary. One which I left gliding about in sea-water, apparently in perfect health, was when I looked at it again after eighteen hours not only dead, but almost wholly decomposed.

P. vittata, Mont.

A single individual of this extremely beautiful species (of which Montagu's two original specimens only have, I believe, hitherto been recorded) was taken by Mr. Hyndman and myself when dredging in Strangford Lough on the 1st of October—in size it exceeded Montagu's, being 2 inches in length and 1 in breadth. It was of a whitish cream colour with black lines, occasionally broken or non-continuous, disposed longitudinally over the upper surface of the body, not unlike those which on a whiter ground render so attractive the plumage of the male silver pheasant (*Phasianus nycthemerus*): these lines are from the delicacy of the animal all visible when the under side—which in itself is plain white—is next the spectator; it was surrounded by a border of pure opaque white, which from the transparency of the entire body within, imparted a beautiful finish to its appearance; the two auricular appendages which emanate from the anterior margin exhibit a black line along their basal half posteriorly; eyes could not be distinguished.

This *Planaria* was in form quite a proteus, and gliding with an easy motion folded itself gracefully over every object that came in its way. Having placed it in a phial of sea-water, one half of the body rested on the bottom and the other against the side, and being thus at the same time horizontal and perpendicular, and presenting throughout its entire length one mass of folds, of which no two were alike in size, it looked as singular as beautiful. Montagu's figure, though correct, gives no idea of the

grace of the original; as usual, his description is admirable; he remarks, that a drawing was fortunately made from his specimens, two in number, upon the day on which they were procured, as next morning they had disappeared, having been dissolved in the sea-water.

Taken by W. T., E. F., and R. B. at Clifden.

P. tremellaris, Müll.

At the end of April I have taken numbers of this species from the under sides of stones in pools among the rocks at Rockport, Belfast Bay. The specimens were rather under the size—"long. 9 lin. lat. 4 lin."—attributed to the species by Müller, but were otherwise identical.

P. rosea, Müll.

At the same time with *Planaria cornuta* two specimens of *P. rosea* were taken. This species has not yet a place in the British Fauna, but it was obtained on the coast of Anglesea last autumn by Mr. M'Andrew and Professor Edward Forbes when dredging there. Müller's specimens were from the coast of Norway.

P. flexilis, Dalzell.

April 14th, 1848.—I found at Cultra, Belfast Bay, two *Planariæ* of this species, adherent to the under side of a stone between tide-marks, and brought them home in sea-water to be observed at leisure. When fully extended they are 6 lines long, and at the head 2½ broad, becoming thence gradually narrower. Eyes commencing at the distance of a line from the anterior extremity of the body; all extremely minute, but differing in size; disposed irregularly in a somewhat crescentic form on either side a transparent circle. The vessels along the centre of the body are prettily ramified, like those of the genus *Glossiphonia*, as represented by Moquin Tandon (Monog. Hirudinées, pl. 14, 2nd edit.). Outside this central distribution of vessels, the body, to very near the margin, is most minutely and beautifully ramified all over; the whole worm presenting the appearance of a *Glossiphonia*, "set"—in jewellers' language—in the centre of a *Planaria* which broadly expands on every side. This appearance is literally "shadowed forth" in Sir J. Dalyell's figure 2. The colour of one of my specimens, which lived for twelve days in a phial of sea-water, changed about once in thirty-six hours, was during the time transparent, with the central *Glossiphonia*-like vessels whitish; the ramifications outside them reddish-lilac.

The motion of these *Planariæ* is "very rapid, smooth, continuous, and even," as Dr. Johnston describes that of the *Plan. subauriculata* to be (Loudon's Mag. Nat. Hist., ix. 16, f. 2), and with which species I cannot but consider the *P. flexilis* identical. The differences set forth in Dr. Johnston's diagnostic characters of the two, are, that the body of *P. flexilis* is "semicircular in front," that of the other "obtuse," and that the intervening space between the eyes is like the rest of the body in *P. flexilis*; but that "a clear circular spot to each of the two clusters of eyes" exists in *P. subauriculata*. The individuals examined by me are occasionally obtuse, and occasionally semicircular in front, and present themselves exactly of the forms represented by both authors, as well as in innumerable other shapes. The position of the eyes is the same in both the supposed species; the clear "circular spot" to each cluster may either have escaped being recorded by Sir J. Dalyell, or possibly may not have existed in his specimens; mine have both clusters of eyes within *one*

transparent circle. On full considerations of the descriptions and figures of *P. flexilis*, Dalyell, and *P. subauriculata*, Johnston, I cannot—although it is opposing my ignorance to Dr. Johnston's knowledge of the subject—believe the species to be distinct. My specimens agree about equally well with both species. Further, it may be remarked that my specimens have presented the form of *Polycelis pallidus*, Quatrefages (Ann. Sci. Nat., t. iv. pl. 3, f. 8, 1845), to which they seem nearly allied; the eyes are just as represented in the highly magnified fig. 9 of that species. It was obtained by M. Quatrefages on many parts of the coast of Sicily. The *P. flexilis* was procured in the Firth of Forth, and *P. subauriculata* in Berwick Bay.

P. stagnalis, Müll.

North of Ireland, Mr. Templeton.

P. lactea, Müll.

This species is marked with doubt from the circumstance of its differing in the following characters from *P. lactea*. The chief central vessel represented in the figure as of about equal breadth throughout, expands in this into an ovate form about the centre of the body—and the ramifications from it, represented as purple in *P. lactea*, are in this of a rich fawn-colour. My specimens are 9 lines in length, when the breadth is 2 lines; eyes pyriform, generally two in number, placed as in *P. lactea* (a specimen had two at one side, and one eye at the other); colour milk-white, but the main vessel and its ramifications, spreading throughout all the body except the mere margin, imparts a handsome delicate fawn-colour to the animal. All of the many specimens taken were of the same colour; the size already noted marks them as considerably larger than Müller's. When in motion they were generally more elongate (of about equal breadth throughout) than *P. lactea* is represented to be, but occasionally appeared of the same form as the figure in the Zoologia Danica.

During an excursion round the shores of Lough Neagh at the beginning of August, 1846, when I was accompanied by A. H. Haliday, Esq., this species was found to be very common, attached to stones at the margin of the lake, and to subaquatic plants. It was gregarious, several individuals being generally adherent to the under side of a stone a few inches in diameter.

P. nigra, Müll.

This species was found abundantly in the same localities, and under similar circumstances with the last. With the unimportant exception of being more of a brown colour and of rather less size, they perfectly agreed with the figure in the Zoologia Danica, and also with the description, so far as given. They were when fully extended 3 lines in length; under a high magnifying power a row of black dots appeared closely disposed round the margin of the anterior part of the body. Sir John G. Dalyell figures similar dots in his *P. nigra* (Observations on Planariæ, fig. 5), but in my specimens there are three for one represented in it—in the description however they are mentioned as numerous.

August 22, 1846.—Three *Planariæ*, agreeing with Sir J. G. Dalyell's *P. nigra*, and brought from the pond in the Zoological Garden, Phœnix Park, Dublin, with *Hydræ*, &c., in May last, are now living before me. These differ from the *P. nigra* of the Zool. Dan. in being of a jet-black, of a much softer consistence, more shapeless, and being able to diminish themselves to a much less size.

When at rest they sometimes appear as a round black spot, not more than half the size of the other when contracted to the utmost, though when stretched out they reach its full dimensions :—they are much more protean in the forms they assume. The softness alluded to is well shown in Dalyell's figure 15—the L. Neagh specimens are always of a firm consistence. When changing the water on these *Planariæ*, the individuals (I shall not call them distinct species) from each locality exhibited a marked difference, though all appeared in equally good health, the latter always retaining their hold against the sides of the phial, while the others, though the liquid was poured out in the gentlest manner, became detached. Specimens which I have obtained on subaquatic plants in ditches at the outskirts of Belfast were similar to those from Lough Neagh.

P. torva, Müll.

Several individuals just as described and figured in the work referred to were obtained under stones at Church Island, Lough Beg (adjoining L. Neagh), on the occasion alluded to under *P. lactea*. Templeton notices "*P. fusca*, Pallas," as Irish (Mag. Nat. Hist., vol. ix. p. 239) without giving any particulars respecting it. This species and *P. torva* are said by Duges to be identical (Lamarck, 2nd edit. vol. iii. p. 607).

P. Arethusa, Dalzell.

Found in April, 1851, on the under side of a stone at Shane's Castle Park, Lough Neagh, W. T.

TRIBE HIRUDINA.

Genus UDONELLA.

U. caligorum, Johnston.

Numerous parasites of this species were attached to a *Caligus* on a grey gurnard (*Trigla Gurnardus*) captured on the coast of Down, on the 22nd of June last, by Mr. Hyndman.

Genus PHYLLINE.

P. hippoglossi, Lam.

For some years past this species has commonly occurred to me on halibut (*Hippoglossus vulgaris*) brought to Belfast market, and captured on the coasts of Down and Antrim.

Genus ERPOBDELLA.

E. tessulata, Müll. (sp.).

In a letter from the Rev. Benj. J. Clarke, dated Tuam, Nov. 22, 1843, it is remarked—"I have a living *Nephelis tessulata* with the young adhering ; I took it in a river here last July with others of the same species, and as this one contained ova, I kept it until the young were born. They have not increased in size for the last two months, and have been clinging to the unfortunate mother for three months." In a subsequent letter it was mentioned that "the parent died in March (after having been kept in a bottle of water for nine months), and left her numerous progeny

adhering in a cluster to the side of the glass. They did not leave her body until the hour of her death: they have increased very little in size in the last four months."

E. vulgaris, Johnst.

Four individuals of this species found among subaquatic plants at Lough Neagh on the occasion already alluded to were brought home for examination. They were not more than half the size of those figured by M.-Tandon, nor of so dark a hue generally—anteriorly they were somewhat hyaline. They each possessed eight eyes, which changed their places like objects in a kaleidoscope; their usual position was, the four anterior in a straight line across the body, and so they always appeared when the anterior portion of the body was pressed against the phial in the act of progression: the hinder pairs of eyes generally appeared as here represented, or across the body, but occasionally displayed themselves in the opposite direction thus, and the anterior eyes were then seen as figured, the head of the creature at the same time having quite a truncated aspect. Of several species of "*Hirudinées*" brought from L. Neagh and kept alive for a few weeks, this was the only one that exhibited the power of swimming; it was extremely active, and wriggled about through the water like an *Ammocœtes*—it was truly "as merry as a grig."

August 20, 1846.—Among the *Hydræ*, &c. alluded to under *Planaria nigra* as brought from the Phœnix Park, Dublin, was an individual of this species:—the water from which it was taken for examination to-day had been kept unchanged for three months in a large glass globe.

Genus GLOSSIPORA.

G. tuberculata, Johnst.

Neighbourhood of Coleraine, Mr. James Bryce, jun.

G. hyalina, Johnst.

Ballydrain Lake, &c., near Belfast, W. T.; Leamington, Warwickshire, W. T.

G. bioculata, Müll.

North of Ireland, Mr. Templeton.

Genus GLOSSIPHONIA.

G. Eachana, Thompson.

Specific Character.—"Body oval; anterior portion not dilated into a distinctly-formed head; back smooth;" margin slightly crenulate; eyes eight; stomachal lobes eight, subpinnate; prevailing hue hyaline.

The size commonly extends to 9 lines. The eight eyes are disposed in four pairs, each pair on the same segment of the body, the two hinder pairs the larger; eight pair stomachal lobes anterior to great stomachal pouches, subpinnate—as much so as represented in *G. marginata*, Moquin-Tandon, pl. 14, f. 14, 2nd edit.—the two anterior pair are small, and when empty but little apparent; from each side of the stomachal lobes emanate four subpinnate branches which appear in a continuous row with the stomachal lobes anterior to the pouches on each side. It may be remarked that the spur-like form of the stomachal pouches (see pl. 13, fig. 6 *c* & *d*, Moquin, 2nd edit.) was not always clearly defined, in which

state their four branches appeared as if issuing directly from the main trunk like the anterior eight pair of lobes. This difference will be understood by a reference to Moquin-Tandon's figure 4, of plate 13 (2nd edit.), representing the ordinary appearance, and his fig. 3, pl. 4 (1st edit.), the latter. Four pair of cæca. *Colour*—back viewed with a very high magnifying power exhibited about four distinct rows of white spots, with a few smaller spots irregularly interspersed; but the general aspect was of a glassy transparency of a very pale red tinge, imparted to it by extremely minute dots of red disposed over the body and disc. This glassy transparency rendered the vessels of the digestive system, which were of a fine dark red colour, very conspicuous; and, owing to the jagged outline of the series of lateral lobes, &c., the creature was so extremely beautiful, that it might be compared to an arborescent agate. It is well entitled to the epithet *vermiculus splendidissimus* applied by Müller to the very nearly allied *Gloss. heteroclita*. To that species it indeed, judging from the description, bears a strong resemblance—but belongs to a different division of the genus:—to that defined as having *more than six stomachal lobes, which are more or less pinnate*, and termed "*Lobina*" by Moquin-Tandon (p. 369, 2nd edit.).

This is the genus *Hæmocharis* of Filippi (not of Savigny): the species here described may be termed *Hæm. Eachana* by those who consider the characters of generic value.

Genus PISCICOLA.

P. geometra, Linn. (sp.).

Lough Eaghish, County Monaghan, and Lough Neagh, Mr. Hyndman. Mr. Templeton has described and figured a new species from the latter locality in Loudon's Magazine of Natural History, vol. ix. p. 236, f. 28, and named it *P. Percæ*. The specimens observed by Mr. Hyndman are the true *P. geometra* as distinguished from *P. Percæ*.

P. Percæ, Templeton.

North of Ireland, Mr. Templeton.

P. marina, Thompson (MSS.).

North of Ireland, W. T.

Smaller one having the margin of the larger sucker "minutely crenulate under a magnifier" (Dr. J.). This specimen (in spirits) is an inch in length and $1\frac{1}{2}$ lines in breadth. It was found attached to a *Lophius*, taken in Belfast Bay, August 19th, 1844, by Mr. Hyndman.

Larger one is $2\frac{1}{4}$ inches long and $1\frac{1}{4}$ lines in breadth, the margin of large sucker is plain under a magnifier in the same degree as the smaller appears crenulate. This large specimen was found attached to the gills of a holibut brought to Belfast market, March, 1840.

A third specimen found adhering externally to the jaw of a cod, December 28th, 1842, by Dr. Drummond.

Genus PONTOBDELLA.

P. muricata, Leach, Zool. Mis.

April, 1847.—Among oysters (large and small specimens) from Strang-

ford Lough. November, 1846.—The largest of great size, the smallest (three or four) an inch long, one of them adherent to a capsule or ovum of a blackish-brown colour. September, 1847.—Several (one large adult) taken among herrings brought to Belfast from Strangford Lough.

P. spinulosa, Leach (Zool. Mis., vol. ii. pl. 65).

Belfast Bay, adherent to cod; adhering to roof of mouth of ling in Belfast market, caught at Killinchy, in October, 1846. Carlingford, Stranraer, Scotland (with oysters to Belfast).

P. lævis, Blainville.

A *Pontobdella* in my collection agrees with this species in all the detailed characters assigned to it in the work referred to, in which the description is taken from Blainville's in the Dict. Sci. Nat., t. 47, 1827, p. 243. The species differs from *P. muricata* and *P. verrucata*, as its name denotes, in being smooth; which it is all over the surface. Where the specimen described by Blainville was procured was not known; but it is stated to have been sent to him by M. Paretto of Genoa. Mine, which may be noted as 4 inches in length, was obtained alive in April, 1838, either at Portpatrick or Donaghadee, by Capt. Fayrer, R. N., who commanded the mail steam-packets between these ports. This gentleman remarked at that period, when sending me the specimen, that he found it in the bottom of a fisherman's boat, into which it must have been brought with sea-weed, then being gathered for manure at low-water. This *Pontobdella* gave out to the spirits in which it was put for preservation a beautiful scarlet colour. A specimen of *P. muricata* which I lately (Oct., 1846) received, imparted a beautiful and intense green colour to the spirits in which it was placed

Genus HÆMOPSIS.

H. vorax, Johnston.

Not uncommon in the North of Ireland, W. T.

Genus HIRUDO.

H. medicinalis, Linn.

"There are also medicinal leeches* on the south side of the lake [Mask]," see O'Flagherty's West or H-Iar Connaught, p. 19, written in 1684. Published in 1846 by the Irish Archæol. Soc.

Medicinal Leech.—November, 1849.—W. R. Wilde, Esq., when at Lough Mask in September last, inquired about this, and was told that it had of late become scarce in consequence of the draining of the lake by the canal between it and Lough Corrib. It is found in pools and wells in the vicinity of Lough Mask, near the canal. A woman who consulted him about her child, which he ordered to be bled with leeches, said the kind from the lake was far better than that at the doctor's, which was smaller and sold at 1*s.* each. In summer the leech-gatherers there sit with their legs in the water, on which the creatures fasten and are thus obtained.

* Irish, *Dallog*.—The leeches found here are stated to be of a good kind; but whether they are used or approved of by medical men for topical bleeding, I have not ascertained. The country people in the neighbourhood use them with good effect.

TRIBE LUMBRICINA.

Genus NAIS.

N. vermicularis, Müll.
North of Ireland, Mr. Templeton.

N. serpentina, Müll.
North of Ireland, Mr. Templeton.

Genus STYLARIA.

S. lacustris, Linn.
North of Ireland, Mr. Templeton.

Genus TUBIFEX.

T. rivulorum, Lam.
North of Ireland, Mr. Templeton.

Genus LUMBRICUS.

L. lineatus, Müll.

Coast of Down, W. T. Was so named by Dr. Johnston, to whom a large collection of Irish Annelides was submitted for the purpose of being named and described; the localities noted were attached to the specimens.

L. pellucidus, Temp.
North of Ireland, Mr. Templeton.

L. omilurus, Temp.
North of Ireland, Mr. Templeton.

L. lividus, Temp.
North of Ireland, Mr. Templeton.

L. gordianus, Temp.
North of Ireland, Mr. Templeton.

L. xanthurus, Temp.
North of Ireland, Mr. Templeton.

L. annularis, Temp.
North of Ireland, Mr. Templeton.

L. terrestris, Linn.
Common.

Genus CIRRATULUS.

C. medusa, Johnst.

Found under stones on the beach at Clew Bay, Co. Mayo, July, 1840, W. T. Dredged in Dalkey Sound, Dublin Bay, R. Ball and E. Forbes.

C. tentaculatus, Mont.
North of Ireland, Mr. Templeton.

Genus TROPHONIA.

T. Goodsiri, Johnst.

Dredged in Strangford Lough, near Portaferry, July, 1838, W. T. The specimens from which the original description was drawn up, were taken in June, 1839, at the Orkneys, by Messrs. Forbes and Goodsir. Donaghadee, Dr. Drummond. In 20 fathoms, Belfast Bay, 1847, Mr. Hyndman. The Irish specimens are much smaller than those described by Dr. Johnston, but the bristles on every part of the body are considerably longer in proportion to the size of the animal than in those from Orkney; they are finely iridescent, like the bristles of the *Aphrodita aculeata*.

ORDER II.—POLYPODA.

TRIBE SERPULINA.

Genus PECTINARIA.

P. belgica, Lam.

North of Ireland; not uncommon; fed upon by flounders, &c., W. T. A tube dredged from about 8 fathoms in Strangford Lough, July, 1838, W. T.

This is the size of the full-grown *Dentalium entalis*, and of similar curvature, but tapers more gracefully from the broad to the fine extremity.

Donovan, in figuring the "straight-tubed Sabella" (*S. tubiformis*, vol. iv. pl. 133), remarked that the *S. granulata*, Linn., from its curvature was probably distinct, and consequently he adopted Pennant's name for the straight one. Penn. figures it quite straight,* as well as Donovan—the latter had never seen it curved. Dr. Drummond, who has often taken the *Amph. auricoma*, never saw its tube otherwise than straight. A specimen of the curved form, of small size, was dredged from 50 fathoms, off South Rock, Co. Down, in 1843, by Mr. Hyndman. Size of my specimen, length 1½ inches; diameter at broader extremity 1-6th of an inch; at narrower 1-16th of an inch.

Genus SABELLARIA.

S. alveolata, Linn.

Common in some parts of Belfast Bay, between tide-marks, W. T. "Cork and Youghal Harbours" (Cork Fauna).

S. crassissima, Penn.

North of Ireland, Mr. Templeton.

Genus TEREBELLA.

T. conchilega, Pall.

Belfast Bay, Strangford Lough, and coast of Down, Mr. Hyndman and W. T. Bangor, Dr. Drummond.

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* He describes it "bent."

T. cirrhata, Mont.

Coast of Down, W. T.

T. cristata, Müll.

North of Ireland, Mr. Templeton.

Genus SABELLA.

S. reniformis, Turt. (sp.).

In a pool among the rocks at the entrance to Strangford, Mr. Hyndman and W. T.

S. penicillus, Linn.

Coast of Down, W. T. Bangor, Mr. Patterson.

S. carnea, Johnst. MSS.

This species was noticed by Montagu, Test. Brit., p. 544, but not named. I have a beautiful figure of it, made some years ago; it is not uncommon in Berwick Bay, Belfast Bay, Strangford Lough, open coast of Down, W. T. &c.

S. tubularia, Mont. (sp.).

Strangford Lough, Mr. Hyndman and W. T.

Genus SPIRORBIS.

S. communis, Flem.

Generally distributed in Ireland.

S. spirillum, Linn. (sp.).

Common in different parts of Ireland.

S. granulatus, Linn. (sp.).

North and East of Ireland. Very plentiful in pools of water a little North of Balbriggan, and at Donaghadee, Br. Turt. Cat.

S. minutus, Mont. (sp.).

East of Ireland.

S. conicus, Flem.

Belfast and Strangford Loughs, W. T. Roundstone, W. T. Clifden, Dr. Farran.

S. lucidus, Mont. (sp.).

"Not uncommon in Lough Strangford" (Brown).

Genus SERPULA.

S. vermicularis, Linn. (not Mont.).

"Strangford Lough, Mr. Hyndman and W. T." *Dr. J.* Templeton gives "*S. vermicularis*, Linn.," in his catalogue, Mag. Nat. Hist., vol. ix. p. 233; but as the species so named by Linnæus and that by

Montagu are different, it is thought proper to notice both here. The following synonyms relate to the latter species.

S. intricata, Linn.; *S. vermicularis*, Müll., Zool. Dan., vol. iii. p. 9, t. 86, f. 9 (animal); Mont. Test. Brit., p. 509. *S. Müllerí*, Berkeley, Mag. Nat. Hist., vol. vii. p. 421, Dr. J. *S. vermicularis*, Mont., is noticed in Capt. Brown's Irish Testacea as found on the Dublin coast and in Lough Strangford.

S. serrulata, Flem.

In a letter from Mr. John Humphreys of Cork, this species is mentioned under the latter name as "detected by G. B. Sowerby on *Pinnæ* sent him from Cork Harbour."

S. vitrea, Fabr.?

Adherent to a stone brought up from deep water, on which were also *Crania personata* and *Caryophyllia Smithii*: Youghal, Dr. R. Ball.* Along with the last on a stone capped by broken *Cellipora cervicornis* dredged from 40 fathoms, off Whitehead, Feb., 1848.

S. triquetra, Linn.

July 15th, 1848.—On looking to many of these living near low-water-mark, at Cultra, Co. Down, I was much struck *in every instance* with the pure white colour of the recently-formed portion as contrasted with the brown colour of the older. It suggested two queries to me: 1st, Is the pure white portion the work of this summer, the brown that of last summer, which had become discoloured during winter, and consequently does the animal not increase its testaceous tube under certain temperature? All the white portion is so pure in colour that it must necessarily be the work of the present season. Taking this for granted, we can, 2ndly, tell the rate of progress that the species makes in shell-building.

Genus FILOGRANA.

F. implexa, Berk.

Belfast Bay, on tangle roots and covering the limpets which burrow in them, W. T. Clifden, Dr. Farran.

Genus DITRUPA.

D. subulata, Berkeley.

The only part of the coast on which this interesting species has hitherto been noticed being the North-West (Zool. Jour., vol. v. p. 424), it may here be mentioned that specimens dredged by Mr. M'Andrew from forty fathoms, and still deeper water off the Old Head of Kinsale and Cape Clear, have been kindly given to me by that gentleman, as have others by Mr. Stutchbury (the able Curator of the Bristol Institution), dredged from ninety-three fathoms, at a distance of ninety miles (English) due South of the last-named locality. Mr. M'Andrew considers this "an abundant deep-water species," and has "obtained it off Scilly in forty-five fathoms;

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* *Vermilia armata*, Flem. Edin. Phil. Journ., vol. xii. p. 243: Strangford Lough, W. T.,—*Serpula contortus*, Brown's MSS. Illus., pl. 2: Dublin coast, Mr. Warren,—are brought by Dr. Johnston under *Serpula triquetra*, Linn.

in the middle of St. George's Channel from sixty fathoms; and westward of Zetland from eighty fathoms."

Genus ARENICOLA.

A. piscatorum, Lam.

Common.

Aug. 3rd, 1848.—I have been surprised of late to see the many kinds of fish that are taken with this bait, viz. *Squalus Mustelus*, *S. Canicula* (both full-grown); *S. Galeus*; *Raia clavata*, *R. maculata* (both full-grown); *Trigla Gurnardus*; *Gadus Morrhua*, *G. minutus*, *Merlangus Carbonarius*, &c. &c.

TRIBE NEREIDINA.

Genus NEREIS.

N. viridis, Johnst.

North and South of Ireland.

N. pelagica, Johnst.

North and South of Ireland.

N. Dumerilii, Johnst.

North of Ireland.

N. fucata, Johnst.

North of Ireland.

N. renalis, Johnst.

North of Ireland.

N. longissima, Johnst.

North of Ireland.

Nereis having the property of *N. noctiluca*, but not that species of the Zoologia Danica.

Sept. 27th, 1847.—Mr. Hyndman dredged a few specimens on Zoophytes from 20 fathoms at entrance of Belfast Bay (bottom shelly sand). They gave, on being disturbed, and then only, a succession of sparks throughout their entire length;* each spark apparently at the junction of the feet with the body. When broken in pieces (and they are extremely brittle), each portion continued to give out the light, in the same manner as the entire animal.

November, 1847.—Dr. Johnston, to whom this was sent, writes me that he knows, but has not described, it.

Genus SYLLIS.

S. armillaris, Müll. (sp.).

Coast of Down, W. T.

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* About $\frac{3}{4}$ inch when extended.

Genus PHYLLODOCE.

April 3rd, 1848.—Mr. Edmund Getty dredged from 5 fathoms to-day, in Belfast Bay, a valve of an oyster filled with a mass of rich "oil-green" gelatinous matter. He was surprised some time afterwards to perceive motion in it, and obtained from it six specimens of a beautiful green *Phyllodoce*, each from 5 to 6 inches long, which he brought to me alive. Their dorsal aspect was of a rich deep green, though not uniformly of this hue, their ventral yellowish, with about as much green towards the margin as yellow along the middle. Their motions were extremely lively, and from their rich green colour they looked beautiful when placed in a white bowl containing sea-water. The gelatinous matter in which they were was of such consistence, as to remain in the single valve of the oyster during the rough operation of dredging, until it reached my friend's hand. It was filled with dark-green round granules, apparent to the naked eye, and which I concluded to be ova. The specimens are preserved, but lost their green colour immediately on being put in spirits. Part of the ova is also preserved in spirits.

P. lamelligera, Johnst.

Coast of Down; Belfast Bay, W. T. Strangford Lough, Mr. Hyndman, and W. T. Bangor, Dr. Drummond.

"*Obs.*—Except in being of much smaller size, the specimen from the last-named locality corresponds well with Blainville's figure of *P. Paretti*. The more I examine the subject, the more I become satisfied that *Phyl. laminosa*, *P. lamelligera*, and *P. Paretti*, are one and the same species; the differences pointed out between them depending, first, on age; secondly, on the description having in some instances been made from living specimens, and in others from specimens preserved in spirits." Dr. Johnston.

N. viridis, Johnst.

Coast of Down, W. T.

Genus NEPHTYS.

N. margaritacea,* Johnst.

Bangor, Dr. Drummond.

August 3rd, 1838.—This is an especial favourite with fish generally, being much preferred to the lug-worm (*Arenicola piscatorum*), but can only be got by the fishermen at extremely low tides. It was unknown at Larne until the Preventive Service came there, when the native fishermen were astonished at the captures they made, and discovered that it was owing to this bait. It was on this species that Dr. Drummond made the experiment with fresh water. See Mag. Nat. Hist. 1829, vol. ii. p. 121.

Holywood, June, 1848.—I saw a fisherman return from digging quantities of these, at extreme low-water-mark; and likewise quantities of the lug-worm of both species, all large and well grown.

* Is it this species that is called Hairy Bait? The fishermen at Dalkey have discovered that in each large Buccinum inhabited by a Hermit crab, is also to be found a Hairy Bait of particularly attractive quality to fish, and used accordingly.

Nephtys is called white-bait often (on account of its silvery appearance) here; it is used for hand-line fishing; the lug being considered good enough for the long lines, at least according to the one fisherman's report.

Genus POLLICITA.

E. peripatus, Johnst.

Bangor, Mr. Patterson.

Genus EUPHROSYNA.

E. foliosa, Aud. and Edw.

Aug. 26, 1844. A very handsome Aphrodite-looking species dredged to-day by Mr. Hyndman off Castle Chichester, Belfast Bay, was brought to me. It was taken about a mile from the shore on shelly ground in from six to ten fathoms water. Being soon after capture sent to Dr. Johnston, it proved as new to him as to myself, and was left at Berwick for him to notice until lately, when, in consequence of his having ceased to study the Annelides, it was returned to me. Professor Allman then kindly undertook its examination, and determined it to be this *Euphrosyna*. The specimen is an inch in length; the size attributed to the species by M. Edwards. Two others, differing only in being smaller, were last year purchased by Dr. R. Ball (of M'Calla), but it was not stated on what part of the coast they were procured. This is the first record of the genus *Euphrosyna* inhabiting the British seas. M. Edwards's specimens were taken on oyster-banks in the two neighbouring localities of St. Malo and between Granville and Chausey; in the latter locality, a league and a half from the shore, and at the depth of fifteen fathoms.

Genus SPIO.

S. calcarea, Temp.

North of Ireland, Mr. Templeton. Belfast Bay, Mr. Patterson.

Genus SIGALION.

S. boa, Johnst.

North of Ireland.

Genus SPINTHER.

S. oniscoides, Johnst.

Captured along with *Euphrosyna foliosa*, by Mr. Hyndman.

Genus POLYNOË.

P. squamata, Johnst.

North of Ireland, Mr. Templeton.

P. cirrata, Johnst.

North of Ireland.

P. scolopendrina, Johnst.

North, East, and West of Ireland.

Genus APHRODITA.

A. aculeata, Linn.

Of general occurrence.

Newcastle (*Down*), *Oct. 2nd*, 1851. There has been a great storm here from the South-East, for the last few days, and some of these Annelides have been washed ashore. Three persons brought specimens (each one) to me as "curiosities they had never seen before." One which I have preserved is very large. Algæ and Zoophytes seem to be growing to its spines. *Polysyphonia parasitica* is certainly parasitic on its back.

A. hystrix, Sav.

Dredged in Belfast Bay, in 8 to 10 fathoms, Mr. Hyndman.
Also found on southern coast.

ENTOZOA.

No notes on Entozoa have been found among Mr. Thompson's papers. The reader is therefore referred to his "Report," in 1843, for the catalogue which had at that time been furnished to him, by the kindness of Dr. Bellingham of Dublin, in which Mr. Thompson has embodied a list of the species recorded by Templeton, and those contributed by Dr. Drummond.

RADIATA.

ECHINODERMATA.

ORDER PINNIGRADA.

Crinoideæ.

Genus COMATULA.

C. rosacea Link (sp.).

Belfast Bay, Strangford and Larne Loughs, J. V. Thompson (Cork Harbour). See Forb. Brit. Echin., p. 14—16, and Introduction, p. xii. Abundant on "Dalkey Sound, and about Ireland's Eye," Dr. Ball, 1828.

Summer, 1835. Dr. Ball and I took (by dredging) the *Comatula* abundantly off Ireland's Eye, and the *Pentacrinus* with it; this latter being in every instance attached to the fronds of *Delesseria sanguinea*. J. V. Thompson found the *Pentacrinus* on the stems of Zoophytes.

Once taken at Courtmasherry Harbour by Dr. Allman. Mr. M'Calla indicates it as found in Roundstone or Birterbuy Bay.

ORDER SPINIGRADA.

Ophiuridæ.

Genus OPHIURA.

O. texturata, Lam.

North of Ireland, Mr. Templeton.

Newcastle, Co. Down, 1851.—I saw remains of it in the fishing-boats: they attach themselves to the lines, and are brought up.

Common at Dublin, and Youghal, Dr. Ball. Abundant on South-West coast, Cork, Prof. Allman. "Cork Harbour," Mr. Humphreys.

O. albida, Forbes.

Taken alike on the open coast and bays of County Down. Dredged from 8 to 10 fathoms at Donaghadee by Dr. Drummond. I have more than once taken a number of this species, and no other, from stomachs of haddock captured in the open sea; so there would seem to be favourite banks for it there as in Strangford Lough. Two specimens dredged at Killery (3 to 12 fathoms), 1840, and Clifden Bay, Roundstone, or Birterbuy Bay, Mr. M'Calla. Dublin coast, Dr. Hassall.

January 26th, 1848.—The stomach of a haddock was filled with broken *Oph. rosula*, excepting space occupied by four specimens of *O. albida*, all of which were perfect to the extremity of the arms. I think this

worth noting, on account of the difficulty we have (though certainly less in *O. albida* than others) in keeping the arms perfect.

Genus OPHIOCOMA.

O. neglecta, Forb.,

I find common on the roots of *Algæ* growing in rock-pools between tide-marks at Annalong and Ardglass. Common on the North-East coast. The first specimen obtained by Mr. Hyndman and myself, in Strangford Lough, in January, 1834, was set apart as an undescribed *Ophiura*. Dr. Johnston, taking a similar view, described the species as new in the following year.

Bangor, Co. Down, July 4th, 1846.—Abundant under stones in shallow rock-pools between tide-marks, the only species I met with, except a very minute *Ast. rubens*. I dredged a specimen from about 8 fathoms in Strangford Lough, 1838, and have one similarly obtained in Belfast Bay, from Holywood outwards. Lambay, W. T.; Lahinch, Co. Clare, W. T. Many dredged at Killery (3 to 12 fathoms), 1840. Dredged in Clew Bay, 3 to 10 fathoms, 1840. Tory Island, Mr. Hyndman.

O. Ballii, mihi.

Disk round or pentangular, covered with imbricated scales, two diverging broadly wedge-shaped scales at the base of each ray.

Largest specimen—disk 2½ lines broad, rays in length nearly equal to four times its breadth; *rays* above with fan-shaped scales, beneath with rudely heart-shaped plates; *spines* four in each row, rough, as long or longer than the breadth of ray. Colour pink.

Several specimens of different size dredged some years ago in Dalkey Sound, on the coast of Dublin, by Dr. Ball. The species is named after my friend, than whom no one in Ireland does more to advance the science of natural history.

Since obtained from Nymph Bank, and in several English localities.

O. filiformis, Forb. Brit. Echin., p. 42.

Abundant at Killery, most so of any species. A specimen was taken on a sandy bottom in Courtmasherry Harbour by Dr. Allman, who sent it to me for examination. Dublin coast, one specimen, Dr. Hassall, A. N. H., ix. 133.

March 29th, 1846.—A quantity found in haddock from Killough, but no other *Ophiura*; there were remains of *Amphidotus, bivalve Mollusca*, &c. Apparently this specimen was dredged by Mr. Hyndman on mud from fifty fathoms off South Rock, Co. Down: the specimens are almost too bad for identification. Two or three specimens dredged in Roundstone Bay, 1840, W. T. Kingstown Harbour, Dr. Ball.

March 4th, 1848.—A number of this species mixed with *O. rosula* and *O. albida* were found in the stomach of haddock—several of the *O. filiformis* had the arms, but these partially broken, attached to the disk.

O. brachiata, Mont. (sp.).

Of this species, apparently known only to Montagu, two specimens were obtained in August, 1836, by Mr. Hyndman and myself, when dredging off Dundrum on the coast of Down; the body of the more perfect one is ⅛ of an inch in diameter, the least injured arm 3½ inches long, and where broken nearly as broad as at the base.

April 23rd, 1842.—On opening a 10 lbs. haddock brought from New-

castle, Co. Down, to Belfast market, I found it, with the exception of a *Nereis* and a small *natica*, entirely filled with from twenty to thirty specimens of *O. brachiata* of all sizes, but chiefly adult. It was in the same locality, Dundrum, that we had formerly procured the species.

April 2nd, 1847.—I took sixteen perfect disks and a number of arms from the stomach of a haddock taken at Newcastle (Co. Down), it contained no other *Ophiura*, but had the remains of *Crustacea*, *Mollusca* (bivalve), and *Annelides*—particulars are preserved as to all the species.

Newcastle, Co. Down, 1851.—*O. brachiata*, *filiformis*, and *bellis*. September 11th, I took several of the first, a few of the second, and one of the third from the stomachs of small haddock taken off Newcastle.

September 19th.—*O. brachiata* and *O. filiformis*. I found in the stomach of a haddock to-day, one of the latter and several of the former, of which there were twenty for one of the *O. filiformis*, in the many haddock I have examined here. There were no other than the two of *Ophiocoma*, but three specimens of shells.

O. granulata, Link (sp.).

Coast of Down, W. T. The species figured by Templeton (Mag. Nat. Hist., ix. 237) with doubt as this species is the *O. rosula*. Common on the Dublin coast, Dr. Ball, in whose collection is one an inch across the body, and six inches in all in diameter.

O. bellis, Link (sp.).

Coast of Dublin, Dr. Ball. Ireland's Eye, Mr. Hyndman. Belfast and Strangford Loughs, W. T. One dredged from 8 to 10 fathoms at Donaghadee, Dr. Drummond. Dredged at Killery with *O. filiformis*, 1840. West of Cork, Dr. Allman; Cork Harbour, Humph.

O. rosula, Link (sp.).

Abundant at Dublin and Youghal, Dr. Ball. On South-West coast of Cork, Dr. Allman. Several dredged at Killery, 1840; and in Clew Bay and Clifden. "Cork Harbour," Mr. Humphreys. In April, 1840, I found a few alive in shallow rock-pools between Holywood and Rockport. Roundstone, Mr. M'Calla.

O. minuta, Forbes.

This *Ophiocoma*, as distinguished by Professor Forbes from *O. rosula* (Wern. Mem., vol. viii.), has occurred to me in the North; and among marine productions from Courtmasherry Harbour (County Cork), favoured me by Dr. Allman, is a fine specimen. Templeton has noted the *O. minuta* of Pennant as Irish, but its identity with the present species is doubtful.

ORDER CIRRHIGRADA.

Asteriadæ.

Genus URASTER.

U. glacialis, Linn.

This species attains a very large size on the southern coast; on the North-East I have obtained a few very small specimens only. *Ast. glacialis* is

noticed in Templeton's catalogue as having been found by Mr. Grimshaw, from whom I learn that the *A. glacialis* of Flem. Brit. Anim. (*Stell. rubens*, Forbes) is the species alluded to, and not the present one.

Common in deep water at Youghal, Dr. Ball, in whose collection is one 15 inches in diameter; many *naticæ* found in them. Occurs on the South-West coast of Cork abundantly, chiefly on a rocky bottom, Dr. Allman. [A large-sized specimen taken in 3 feet water at Ardrossan, sent me by Major Martin.] One dredged in Clifden Bay, 4 to 10 fathoms, 1840. Roundstone, by Mr. M'Calla. Glendore, Co. Cork, Dr. Allman. Common species at Youghal, according to Dr. Ball, and eats the bait off the long lines, to the great annoyance of the fishermen. *Cyprææ* have been found in it by Miss M. Ball. Taken on South-West coast of Cork by Dr. Allman. "Cork Harbour, Mr. Humphreys. Lahinch, County Clare, between tide-marks, and abundant among rocks, W. T. Dredged at Killery, 1840, and Bundoran, W. T.

U. violacea, Müll.

Northern, eastern, and southern coasts (Dr. Ball). The typical forms of *U. violacea* and *U. rubens* are very distinct in appearance, yet, through their varieties, they sometimes approach so nearly as to render the propriety of their separation as species somewhat doubtful.

Taken on South-West coast of Cork, by Dr. Allman; many dredged at Killery, 1840. Dublin coast, Mr. Hassall; cast ashore in Belfast Bay, like *U. rubens* and *S. papposa*.

U. rubens, Linn.

Common from 30 fathoms to a few feet.

U. hispida, Penn.

Coast of Down, W. T. Roundstone, Mr. M'Calla.

Genus CRIBELLA.

C. oculata, Penn.

North of Ireland. "Found about Dublin and Youghal," Dr. Ball, who says it is purple when recent.* Dredged in Clew Bay, 3 to 10 fathoms, 1840, W. T.

Roundstone, Mr. M'Calla.

C. rosea, Müll.

In Dr. Ball's collection I have seen two specimens of this star-fish, which is an addition to the British Fauna; they were obtained in 1818 at the Nymph Bank, off the southern coast. One specimen, which is perfect, is 4 inches across; the arms of the other, though much injured, are each 5 inches in length. The species is admirably represented in the Zoologia Danica.

Genus SOLASTER.

S. endeca, Linn.

North of Ireland, Belfast Bay, W. T. Dublin and Youghal, specimens 9 inches in diameter in Dr. Ball's collection. Miss M. Ball has found *Natica intricata* in it.

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* I obtained purple, bright yellow, bright scarlet, and variegated specimens this year, 1854, at Dalkey. *R. Ball.*

S. papposa, Linn.

Often thrown ashore in large quantities at Portmarnock. Dr. Ball has one 11 inches in diameter in his collection—rays 12 to 15 in number. *Cypræa Europæa* found in one of his specimens. Cork, Mr. Humphreys. Roundstone, Mr. M'Calla.

Genus PALMIPES.

P. membranaceus, Retz.

Belfast Bay and Strangford Lough. A specimen 6 inches in diameter from Youghal, in Dr. Ball's collection, the only specimen he obtained there; but the fishermen informed him that they had often taken the species when trawling. Mr. J. W. Warren, in March, 1846, wrote me (I saw it afterwards) that he had got a very perfect specimen, dredged about seven miles off the Dublin coast.

Genus ASTERINA.

A. gibbosa, Penn.

Coasts of Down, Antrim, and Dublin, W. T.; southern and western shores, Dr. Ball.

Aug. 25th, 1851.—I found several about the roots of *Cystoseira* in rock-pools at Ardglass. Strangford, W. T. Taken on South-West coast of Cork, Dr. Allman. Kinsale and Glendore, Dr. Ball. Lambay Island, W. T. Lahinch, Co. Clare, W. T. Youghal, Miss M. Ball. Cork Harbour, Mr. Humphreys. Roundstone, Mr. M'Calla.*

Genus GONIASTER.

G. Templetoni, Thomp.

On examination of a species of *Goniaster* obtained by Dr. Ball from the Nymph Bank more than thirty years ago, it seemed to correspond with the description of what Mr. Templeton considered doubtfully as the *Ast. equestris* (Mag. Nat. Hist., vol. ix. p. 237), and appearing at the same time to be undescribed, I named it as above. Mr. Templeton's specimen is not now available for comparison, but the gentleman who found it, on being lately shown one from the South, stated that they were certainly of the same species. The *G. Templetoni* approaches the *Ast. pulvillus*, Müll. Z. D., vol. i. p. 19, tab. 19, more nearly than any other, and chiefly differs from it in the under surface being conspicuously tessellated.

A specimen taken by us in Strangford Lough, 5 inches in diameter. June, 1844. Dr. Allman presented to the Dublin Nat. Hist. Society, a specimen obtained by Mr. Gabbet on the coast of Clare. Tory Island, Mr. Hyndman.

Genus ASTERIAS.

A. aurantiaca, Linn.

Strangford, Mr. Hyndman and W. T. One specimen dredged by us off Bundoran, 1840; one dredged off Newcastle, Co. Down, with a *Donax trunculus* in its mouth. Taken on the South-West coast of Cork generally, and abundantly in Ross Bay, by trawling, Dr. Allman. Not uncommon in deep water at Youghal, Miss M. Ball; who has found nine specimens of *Natica intricata* and a *Turritella terebra* in one individual. A

* The Rt. Hon. the Lord Chancellor Brady obtained this species at Kilkee, in 1855, and forwarded several specimens by post to Dr. Ball, who thus received them alive.

specimen of Dr. Ball's is 7½ inches in diameter; the species attains 9 inches at Youghal. Dublin Bay, Dr. Ball.

Genus ECHIDIA.

L. fragillissima, Forbes.

Deep water near Youghal, Dr. Ball; sometimes 16 inches in diameter, and with 7 rays.

Not unfrequent at Glandore, Dr. Allman. Roundstone, Mr. M'Calla.

ORDER CIRRHI-SPINIGRADA.

Echinidæ.

Genus ECHINUS.

E. sphæra, Müll.

Of general occurrence. Tory Island, Mr. Hyndman.

E. miliaris, Leske.

On all the Irish coasts. Newcastle, Co. Down, 1851; two of these were dredged by me from 4 fathoms in Strangford Lough, each 1½ inches in length, and 1 inch in height, not reckoning spines. I have taken several others of similar size up to 1¾ inch, the largest mentioned by Forbes.

The form of these *Echini* (taken in Strangford Lough) was not "depressed," as it is stated by that author the species always is. They are of the same form as *E. sphæra* of equal size.

E. Flemingii, Ball.

In deep water off Youghal, South-West of Ireland, Dr. Ball.

E. lividus, Lam.

Coasts of Galway and Mayo, Dr. Ball. West coast of Cork, Dr. Allman. "Bantry," Cork Fauna.

Roundstone, Mr. M'Calla. Numerous among loose-rolled stones of granite—and consequently not burrowing—on the beach at Tory Island, Mr. Hyndman.*

Genus ECHINOCYAMUS.

E. pusillus, Müll.

Taken many years ago in Belfast Bay, W. T. Numbers dredged from 20 to 23 fathoms, shelly bottom, Belfast Bay, Oct. 3rd, 1846, Mr. Hyndman. West coast of Cork, Dr. Allman. Cork Harbour, Mr. Humphreys. Roundstone, Mr. M'Calla.

Genus SPATANGUS.

S. purpureus, Müll.

May, 1842.—A number of fine specimens dredged up alive at entrance of Belfast Bay, by Mr. Hyndman. In same locality, 20 to 23 fathoms,

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* Bay of Dunfanaghy, Rev. Mr. Gallagher, 1852, also at Malin Head, 1853.—Ed.

shelly bottom, Strangford Lough, Mr. Hyndman.' Cork, Mr. Humphreys. December 16th, 1850. In the stomach of a haddock taken at Newcastle, Co. Down, I found a perfect small specimen of this species and another broken one. Off Bray, Dr. Ball.

Genus BRISSUS.

B. lyrifer, Forbes.

Of this species—discovered by Professor E. Forbes in the Clyde, in 1840—a few individuals were obtained off the South-West coast of Ireland by Mr. M'Andrew. To use this gentleman's words, "One or two specimens were brought up from a depth of forty fathoms off Cork and off Cape Clear, and from thirty fathoms in Bantry Bay, near Great Bear Island. I have found it a frequent inhabitant of muddy bottoms in from 12 to 100 fathoms."

Genus AMPHIDOTUS.

A. cordatus, Penn.

Of general occurrence; is thrown ashore on the beach at Newcastle in quantity, so much so, as sometimes to look like a row of round frothy balls sent in before the advancing tide.

A. roseus, Forbes.

Not so generally distributed.

ORDER, CIRRHI-VERMIGRADA.

Holothuriadæ.

Genus PSOLUS.

P. phantapus, Linn.

In September, 1835, I obtained by the dredge a single specimen at Bangor, County of Down.

Genus CUCUMARIA.

C. pentactes, Müll.

Among a quantity of marine productions dredged in Belfast Bay, by my friend Edmund Getty, Esq., and kindly sent to me, was an injured specimen 2 inches in length, apparently of this species. I can now announce the species with certainty, Dr. Drummond having procured an example of it when dredging at Bangor in June, 1839. Several specimens dredged in 15 to 30 fathoms in Bantry Bay, Mr. M'Andrew.

C. communis, Forbes and Goodsir.

North of Ireland, W. T. Youghal, Dr. Ball. Roundstone, Mr. M'Calla.

C. fusiformis, Forbes and Goodsir, Brit. Echin., p. 219.

This species has already been enumerated in my report on the Invertebrata of Ireland, but no particulars respecting it have been published. The specimen there alluded to was dredged in 10 fathom water, at Donaghadee, by Dr. J. L. Drummond, in the summer of 1843.

C. Drummondii, mihi.

Of an olivaceous and white colour, with light brown suckers, which are very numerous on the angles, from 6 to 12 in each transverse irregular row; when contracted, tentacula long, pedicled, trifid, plumose, purple.

Length 10 inches.

After having been kept in spirits for a short time, it appears angular, corrugated, the corrugations smooth; a few suckers between them.

The specimen was dredged in Belfast Bay, in the month of June, by Dr. J. L. Drummond, who drew up the following description from the living animal:—

"*Bangor, June* 27, 1839.—Holothuria dredged yesterday of an olivaceous and white colour; at first, the shape of a lemon, and nearly as large as a middle-sized one; to-day, 10 inches long, contracting itself slowly in various places, but has not yet shown its tentacula. It has five broad longitudinal bands of tubercle-like suckers running from end to end; these have four in each transverse row; suckers light brown; down the middle of each of the five series a whitish band extends; spaces between the belts of suckers of a bluish-white, with numerous irregular narrow transverse whiter lines of various breadth."

C. Hyndmani, mihi.

White, 5-angled, skin smooth, a double close row of large (non-retractile ?) suckers on each angle; tentacula 10, sessile, white, plumose.

Length 2 inches.

Dredged in Belfast Bay, by my friend Mr. G. C. Hyndman, a well-informed and zealous naturalist, to whom it is dedicated.

Many dredged at Killery, 3 to 12 fathoms, in 1840. Roundstone, Mr. M'Calla.

C. inhærens, Müll.

An example of this species, about 3 inches in length, or as represented in the Zoologia Danica, was found by Mrs. W. J. Hancock, cast on the beach at Balbriggan (County Dublin) after a storm in March, 1843. This has not been noticed as a British species.

C. niger, Couch.

Obtained by Mr. W. Todhunter, on the West coast, Sept., 1848.*

Genus OCNUS.

O. brunneus, Forbes.

Of this species I obtained several specimens by dredging in Strangford Lough in June, 1838. At the same period of the following year, some were similarly procured by Dr. Drummond, in Belfast Bay.

O. lacteus, Forbes and Goodsir.

North-East coast, W. T. Lahinch, Co. Clare, W. T. Glendore, Professor Allman.

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* At Tory Island, off the North-West coast of Donegal, Mr. Hyndman procured a specimen of this genus in a rock-pool between tide-marks, in August, 1845. I abstain from naming the species, even with doubt, in the present state of our knowledge of the *Holothuriæ*.

Supposed to be *C. Niger*.—ED.

Genus THYONE.

T. papillosa, Müll.

May, 1846.—Six specimens found among Killinchy oysters in Belfast market, brought to me alive.

October, 1846.—Ten specimens, as above.

Bantry Bay, 15 to 30 fathoms, Mr. M'Andrew. A few dredged at Killery, 1840.

T. Portlockii, Forbes.

Belfast Bay, Colonel Portlock.

T. raphanus, Duben and Koren.

A specimen was dredged from between 15 to 30 fathoms about Bantry Bay, by Mr. M'Andrew, in 1846.

Genus CHIRODOTA.

C. digitata, Mont. (sp.).

On the 18th of December, 1843, an individual of this species, which had hitherto been obtained only by Montagu, in Devonshire, was found lying on the sand between tide-marks near Carrickfergus Castle, during a search for natural history objects by Mr. Hyndman and myself.

ORDER VERMIGRADA.

Sipunculidæ.

Genus SYRINX.

S. papillosus, mihi.

Vermiform, brownish-white, skin striated concentrically and covered with brown papillæ.

This is a fine and large species; throughout the greater part of its length posteriorly, the papillæ are more numerous and larger on the two sides than on the dorsal and ventral surfaces, and are particularly numerous at the posterior extremity, which is pointed and not perforated. It does not appear to be parasitic.

Specimens have been obtained at Miltown Malbay by Professor Harvey, and at the South Islands of Arran (an adjacent locality) by Dr. Ball. Professor Harvey informs me that this species is not uncommon under stones in sand-covered rocks at Miltown Malbay.

S. Harveii, Forbes.

Two specimens of a *Syrinx* were dredged in Strangford Lough from a depth of 15 to 20 fathoms on an oozy bottom in June last, by Mr. Hyndman and myself. They agree with the *S. Harveii*, and at the same time with the *S. granulosus*, M'Coy (Annals, vol. xv. p. 272, pl. 16, fig. 2), accordingly as they are viewed by the unassisted eye or by magnifying power. The body of the former is described as being "quite smooth," of the latter "nearly smooth, very minutely and uniformly granulated;" a difference which we might expect to find between examples of 2½ and 7 inches in

length; these being the respective dimensions of those described by Professor Forbes and Mr. M'Coy. The body of my specimens—the larger of which is under 2 inches in length—appears to the unassisted eye not only quite smooth, but shining, though in a subdued tone; yet, when magnified, extremely minute papillæ are seen over its surface. I therefore regard *S. granulosus* as not distinct from *S. Harveii*. The figure of *S. granulosus* represents my specimens very well: they are of a very pale greyish-brown colour.

S. Forbesii, M'Coy (Ann. Nat. Hist., vol. xv.).

Roundstone, not uncommon, Professor M'Coy.

S. tenuicinctus, M'Coy (Ann. Nat. Hist., vol. xv.).

Very common, West of Ireland, Professor M'Coy.*

Genus SIPUNCULUS.

S. Bernhardus, Forbes.

Belfast and Strangford Loughs; Killery in the West, W. T.

S. Pallasii, Thompson MSS.

North of Ireland.

Genus PRIAPULUS.

P. caudatus, Lam.

North of Ireland, W. T. Dublin Bay, Dr. Coulter. Roundstone, at low-water mark, Mr. M'Calla. Dredged in Birterbuy Bay, Dr. Farran.

From Larne Lough, in October, 1849, Mr. Wm. Darragh brought two of these, where they were dug up with the two species of lug-worm. They are used as bait, but the fish do not take them so freely as they do the two kinds of lug-worm. The young coal-fish take them more freely than the young codlings do.

Genus THALASSEMA.

T. Neptuni, Gærtn.

North of Ireland, Mr. Templeton.

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* Mr. Hyndman found two specimens of an unknown species (? ?) of this genus under stones at Tory Island.

ACALEPHA.

SIPHONOPHORA.

Genus DIPHYA.

D. elongata, Hyndman.

North of Ireland.
In the West, at Bundoran, Mrs. Hancock.

Genus PHYSALIA.

P. pelagica, Eschscholtz.

South of Ireland, Miss Ball. Two specimens obtained at different times.

Genus VELELLA.

V. mutica, Lam.

August 11*th*, 1836.—Groomsport, W. T.

June (end of), 1840.—Dr. Wm. M'Gee gave me several specimens which he picked up after northern winds on the strand at Portrush; in an hour he would find about twenty specimens.

July, 1843.—On looking to specimens in spirits from Larne, Portrush, and Youghal, they seem to be *V. limbosa*, as I think specimens were picked up by us about Ballyshannon, Bundoran, &c., on the western coast in July, 1840.

South of Ireland, Mrs. Mant.

V. subemarginata, Thompson.

Membranous base oblong, slightly cut round the edge, in length 2 inches 10 lines, breadth 1 inch 7½ lines: crest almost crescentic in form or obscurely pointed at highest part, thick in substance, with a minute vein-like ramification appearing throughout; body proper, or skeleton, of a narrow oblong form, rounded at ends, in length 2 inches 4 lines, breadth 10 lines.

Colour when recent according to Professor Allman: "Disc, margin and tentacula fine sky-blue; sail light blue, nearly transparent, margined with delicate violet. Skeleton colourless and transparent."

This species differs from the ordinary *Velella* of the Irish coast in its greatly superior size, in the margin of the membranous base being slightly emarginate, in the crest being of a much stronger consistence and of a more rounded outline.

The specimen here described was given to me by Professor Allman, who saw great abundance of them on the shore of Courtmasherry Harbour (County Cork) after a south-westerly gale late in the autumn of 1838 or 1839, but preserved only one.

This description of a *Velella* from spirits must necessarily be unsatisfactory, but it seems to me better that a species should, under such circumstances, be noticed than passed over altogether—*named* it perhaps should not be, but this has already been done in my Report on the Invertebrata of Ireland; the specific name there is given erroneously *emarginata*.

Genus AGALMA.

A. Gettiana, Hyndman.

Belfast Bay, Mr. Getty.

CILIOGRADA.

Genus BEROE.

B. cucumis, Fabr.

Bangor, Co. Down, July, 1846, Mr. Hyndman and W. T.

B. fulgens, Macartney.

On Macartney's authority (Prof. E. Forbes). This is a mistake; the specimens were taken in Herne Bay.

Genus CYDIPPE.

"*C. pileus*, Lin. (sp.), Irish Sea."

Communicated by Professor E. Forbes.

C. lagena, Forbes.

North of Ireland.

C. pomiformis, Patterson.

North, East, and South of Ireland.

Genus ALCINOE.

A. Smithii, Forbes.

North of Ireland.

A. Hibernica (sp.), Patterson.

North, East, and South of Ireland.

PULMOGRADA.

Genus MELICERTUM.

"*M. campanulatum*, Ehrenb. Ballycastle; Portrush, near Giant's Causeway."

Professor E. Forbes.

Genus HIPPOCRENE.

H. Britannica, Forbes.

Ballycastle, Professor Forbes. Strangford Lough, Mr. Patterson.

Genus SARSIA.

S. tubulosa, Lesson.

April 18, 1840.—I had the satisfaction to-day of identifying with this species a *Medusa*, of which several individuals were brought to me by Mr. Hyndman, just after their capture in Belfast Bay. On calling the attention of Mr. R. Patterson to them, a reference to his notes on *Medusæ* showed that he had procured the same species at Larne (County Antrim), in May, 1835, and June, 1838; and again at Bangor (County Down), in July, 1839. As my friend could not find the species described—Sars' work he had not for reference—he drew up a detailed and interesting account of the animal, accompanied by several characteristic sketches of it in various positions.

Having remarked that one of my specimens, which was in a phial containing 1½ ounce of sea-water, appeared as lively after four days' captivity as at first, although the fluid had not been changed, nor any nutriment added, I, before leaving home for some days, handed it over to Mr. Patterson, that the period the animal would live under such circumstances might be noted. From him I learn that this individual lived thus for twelve days (from the 18th to the 30th of April), and that for the first ten it retained its ordinary vivacity.

Genus OCEANIA.

O. papillata, Müll.

Of this very minute species, 1½ line in diameter, a specimen occurred to me in Strangford Lough in October.

Genus THAUMANTIAS.

T. hæmisphærica, Müll.

On October 5, 1838, I obtained one of these *Medusæ* in Belfast Bay, and a day or two afterwards many specimens were brought me by Mr. Hyndman from the same locality. In size they rather exceeded Müller's, measuring 5 lines in diameter in their most depressed state. This and the preceding species were determined from accurate drawings taken of the living animals. Mr. R. Patterson informs me that he obtained the *P. hæmisphærica* at Larne in the summer of 1835.

T. pileata, Forbes.

North of Ireland, at Portrush, Smith and Forbes.

T. Thompsoni, Forbes.

West and South of Ireland.

Genus EPHYSA.

E. simplex, Penn.

North of Ireland.

"Probably, as Cuvier suggests, some species in a mutilated state," Professor E. Forbes.

E. hæmisphærica, Templeton.

North of Ireland.

"Perhaps a young state of *Aurelia*," Professor E. Forbes.

Genus OBELIA.

O. vitrea, Penn. (sp.).

North of Ireland.

In middle of July, 1847, I saw a few at Holywood, the largest about 12 inches in diameter: they were pure hyaline, with a rich brown spot in the centre, and rays of the same colour nearly reaching the margin.

Genus OCYROE.

? O. cruciata, Temp.

North of Ireland.

Genus CHRYSÆORA.

C. tuberculata, Penn. (sp.).

"This and the preceding are badly observed species," Prof. E. Forbes.

Genus AURELIA.

"*A. aurita*, Linn. (sp.).

"North, West, and East coasts," Prof. E. Forbes. A species so called has been before noticed as Irish, but as more than one has passed under the name, the true species according to Prof. Forbes is here repeated.

Co. Down, Bangor, July 4th, 1846, G. C. H. and W. T. *A. aurita*. Of all sizes in profusion. We watched their graceful motions in a deep pool for a long time, with extreme interest.

July 20th, 1849.—A *N. W.* wind has been blowing for the last two days, and has been the means of the greatest number of these being thrown ashore at Holywood Warren that ever I saw. A quarter of a mile of the beach, or so far as I walked, and for about twelve yards in breadth from low-water mark inwards, has fully one-fifth of its entire surface covered with them.

Middle of July, 1847, a great number on the beach at Holywood Warren.

End of July, I did not see one there.

"*A. bilobata*, Forbes MSS. Portrush."

Prof. E. Forbes.

Genus RHIZOSTOMA.

R. Cuvierii, Blainv.

Belfast, August 6, 1838.—I received a fine specimen of this *Medusa* from Edmund Getty, Esq., whose attention was called to it yesterday by an old fisherman seventy years of age, who stated that "a large starfish, he had not seen the like of before," was lying on the beach near Holywood (Belfast Bay). The specimen exactly accords with Blainville's figure of *R. Cuvierii* and with the *Med. undulata* of Borlase, as quoted by Pennant and Fleming. Its total length is 18 inches, the body 7½, and thence to extremity of peduncles 10½ inches; entire outer surface of the body, which is 12 inches in diameter, granulated over like the rind of an orange or lemon. The body is almost hyaline, with a very slight tinge of dusky

yellow; peduncles and their appendages delicately tinged with lilac and roseate hues. Weight 6 lbs.

Youghal, Dr. Ball.

Genus CYANÆA.

" *C. Lamarckii*, Péron.

County Galway coast. July, 1840." Dr. Ball, W. Thompson, Prof. Forbes.

End of July, 1847.—Judging chiefly from its dark reddish-brown (mahogany colour) hue, in which it is strikingly different from the latter, is abundant at Holywood Warren, having taken the place of the next species, which was plentiful in the middle of July.

C. capillata, Linn. (sp.).

North and West of Ireland.

Mid. July, 1847.—What I take to be this species from its light colour, &c., abundant of all sizes to near 18 inches diameter at Holywood Warren.

The same stinging species at same place and of huge size (same as *thrown on the beach*, nearly a yard in diameter, i. e. feelers, &c., and appearing as one mass), I remarked the first about ten days ago.

The two last named are the only native stinging species, according to Prof. Edward Forbes. One of these species at least makes its appearance in Belfast Bay in multitudes at the beginning of August.

Genus ÆQUOREA.

? *Æ. radiata*, Templeton.

North of Ireland.

Genus CALLIRHOE.

? *C. dubia*, Templeton.

North of Ireland.

Genus MEDUSA.

" *M. scintillans*," Macartney.

North of Ireland. (" Probably the fry of some " species.) Prof. E. Forbes.

ZOOPHYTES.

ORDER HYDROIDA.

Genus CLAVA.

C. multicornis, P. S. Pallas.

Plentifully on *Fuci*, within tide-marks, at entrance to Strangford Lough. Oct., 1839. Clifden, Connemara, W. T.

C. capitata, Müller.

North and East of Ireland.

C. minuticornis, Müller.

"Adhering to *F. vesiculosus*, at White House Point, Belfast Lough. Oct., 1840." Templeton.

Genus CORYNE.

C. pusilla, Gaertner.

(*T. muscoides*, Linn.). A few specimens of a *Tubularia* which I obtained in Strangford Lough, in January, 1835, parasitical on *Fucus nodosus*, and subsequently between tide-marks at the island of Ireland's Eye, off the Dublin coast, were placed in my collection under this name. Having supplied a specimen to my friend Dr. G. Johnston, he remarked upon it—"This is what Agardh and Lamouroux say is the real *T. muscoides* of Linn., but not of any other author excepting Müller and Fabricius—you are the first to discover it on our shores." In so far as my limited observation extends, this would seem to be a littoral, *T. indivisa* and *T. larynx* to be deep-water species.

C. Listeri, Van Ben. (sp.).

I obtained this zoophyte attached to stones between tide-marks at Ballyholme, Belfast Bay. Both polype and polypidom agreed in every character of form and colour with the description given in Dr. Johnston's work, but I cannot think this and the *Coryne* (*C. squamata*, Johnst. Brit. Zoop., pl. 2, figs. 2 & 3, 1st edit.) which is commonly found on the *Fuci* (especially *Fucus nodosus*) of our shores, the same species. This latter generally forms masses at the base of the branches and around the stem of the plant named: each individual rises singly from its base, as represented in the figures referred to. The one is a branched, the other a simple, species: the polypidom is horny (*Tubularia*-like) in *S. Listeri*; in the other soft and fleshy.

Genus CORDYLOPHORA.

C. lacustris, Allman.

In the dock of the Grand Canal, Dublin, Professor Allman.

Genus EUDENDRIUM.

E. rameum, Johnst.

Black Rock, Dublin Bay, Dr. Hassall.

E. ramosum, Ellis.

Noticed by Templeton as found in Dublin Bay; it occurs not uncommonly on shells dredged in deep water on the North-East coast.

Found sparingly around the coast of Ireland, investing shells. The figure in Ellis's Corall., pl. XVII., is a good representation of the species as it has occurred to me; I have never met with *E. ramosum*, even in a dried state, in which it could be confounded with *T. larynx* (see Brit. Zoop., p. 117). The specimens which have come under my observation were always of a stronger texture, and of an extremely different habit from any variety of *T. larynx*, having moreover a brownish horn-colour, instead of the hyaline aspect of that species. More might be said on the subject, but a comparison of Ellis's fig. of *T. ramosa*, pl. XVII., with Dr. Johnston's *T. larynx*, will exhibit other differences sufficiently. W. T.

I found this species along with many other Zoophytes in the trawl-nets of the Howth (Co. Dublin) fishermen, in April, 1835; have dredged it in Belfast Bay, and found it parasitic on oysters and the *Capulus Hungaricus* from the Down coast, but rarely more than one or two specimens on any occasion. Obtained at Magilligan by Mr. Hyndman, 1838. Ellis's figure in plate XVII. is a good representation of the species as it has occurred to me. Killery Bay, W. T.

Courtmasherry Harbour, Co. Cork, Prof. Allman. On *Pinna* in my collection from Cork.

Genus TUBULARIA.

T. indivisa, Linn.

Dublin Bay, Prof. Harvey, 1834; Youghal, Miss Ball, 1836; Belfast and Strangford Loughs, Mr. Hyndman and W. T.

Fine specimens 9 inches in height obtained by Dr. Ball in Dublin Bay, Sept., 1839.

Dredged in the open sea along the Antrim coast, by Mr. R. Patterson. On a *Balanus* attached to an oyster dredged at Greencastle, Londonderry, W. T. Youghal, Miss Ball.

T. larynx, Ellis.

Belfast and Strangford Loughs, Mr. Hyndman and W. T.; Dublin Bay, Dr. Ball.

This is not uncommonly found attached to *T. indivisa;* but in Belfast and Strangford Loughs is chiefly parasitic on *Desmarestia aculeata*. From about every inch or so of the stem and main branches of the plant the tubes issue somewhat in a whorled manner (to use a botanical expression) to about the distance of one or two inches on every side.

In Belfast Bay, Mr. Hyndman dredged a fine specimen 3½ inches in height, and as much in breadth, and which springs from a single base. The tubes are simple throughout. W. T.

Genus THOA.

Thoa halecina, Lam.

Clew Bay and Antrim, Down, and Dublin coasts, W. T. Killery Bay, W. T. Magilligan, Co. Londonderry, Mr. Hyndman. The specimens

brought thence by Mr. Hyndman are remarkably fine, their ordinary height being 9 inches; some of them, too, branch profusely, so as to occupy nearly as much space in breadth as in height:—one specimen had attained the height of 12 inches. Nov., 1842, attached to *Pecten maximus* in Belfast market; the shells stated to have been dredged in the Bay. W. T.

T. Beanii, Johnst.

Procured by dredging in Belfast Bay, where it in some situations seems to take the place of *T. halecina*. Before it was described as a distinct species, its peculiarities, independently of the remarkable ovaries, were noticed by Mr. Hyndman and myself; its general aspect or habit first attracted our attention. Instead of the rigid "herring bone" appearance of *T. halecina*, it is somewhat flexible and graceful. Although not mentioned in the description, this difference is observable in the plates of the British Zoophytes.

Among Zoophytes collected in Dublin Bay, by Prof. Harvey, in 1834, and kindly sent to me, were examples of this species. Adherent to oysters dredged at Killough, Co. Down. W. T.

T. muricata, Johnst.

For the only Irish specimen, a mere fragment of this *Thoa* which I have seen, I am indebted to Dr. Hassall, who found it near the Giant's Causeway. W. T. 1842.

Genus SERTULARIA.

S. polyzonias, Linn.

Dublin Bay, 1834, Prof. Harvey. Youghal, Miss Ball. Magilligan, Co. Londonderry, Mr. Hyndman. This is one of our most common *Sertulariæ*, on the coasts of Down and Antrim, and indeed those of Ireland generally; it is usually attached to *Algæ* and *Zoophytes*, more especially to *Halidrys siliquosa* and *Flustra foliacea*. The largest and finest specimens I have seen were from deep water, where, even on our northern coasts, they in more than one locality attained the magnitude mentioned by Templeton of 5 inches in height. See his description of *S. pinnata*. The *Sertularia* which commonly passes under the name of *polyzonias* in Ireland is the form figured in Ellis, and which is considered by M. Edwards distinct from the erect form represented on the same plate. He names the flexuous form *S. Ellisii*.

All the specimens in my collection from various localities, whether growing in a flexuous or erect state, winding round the stem of Algæ, or expanding in an arborescent form, with a single main stem (if it may so be called), have the cells with a toothed rim, and the vesicles toothed. I have not seen any vesicles with such an orifice as is represented in the erect form by Ellis, plate 2, fig. A.

S. rugosa, Linn.

On *Flustra foliacea* collected at Magilligan, Co. Londonderry, by Mr. Hyndman, 1838. On same species from Bootle coast, Liverpool, Mr. Henry Johnston, 1840; and on same, dredged at Sana Island, off the Mull f Cantire, Mr. Hyndman, 1841.

S. rosacea, Linn.

Dublin Bay, 1834, Prof. Harvey. April, 1835.

Found commonly attached to other Zoophytes, picked from the trawl-nets of the Howth (Co. Dublin) fishermen, Dr. Ball and W. T. On the stems of *Laminaria digitata*, thrown ashore in Belfast Bay, and similarly procured at Youghal, Miss Ball. Magilligan, Mr. Hyndman.

Much more delicate and graceful when springing from the stem of its kindred species (*Sertularia argentea*, *Plumularia falcata*, &c.) than from those of the *Lam. digitata*, the colour also in the former case being of a brighter and more agreeable hue. In the same locality, Belfast Bay, it differs thus according as it emanates from a Zoophyte or Laminaria. The much stronger and more robust development of *S. rosacea* on the stems of *Lam. digitata*, remind me of the equally greater development of an Alga (*Ptilota plumosa*) upon its stems, than when springing from a rock, and in so far as specimens have come under my observation, each state of the Zoophyte is as permanent, according to the object upon which it is based, as is the case in the Alga.

The vesicles too, it should be mentioned, differ; those on my *S. rosacea* based on the Zoophyte are admirably represented in Ellis's Cor., pl. 4, fig. A.

S. pumila, Linn.

Antrim, Down, and Dublin coasts. Clifden, Connemara, W. T.

A littoral species growing on the *Fuci* (especially *F. serratus*, *F. nodosus*, and *F. vesiculosus*), in shallow water, and those exposed to the air at every ebb of the tide. At the island of Ireland's Eye (Dublin coast), it most profusely invests the *Fuci* exposed at low water, so that a person might say with truth that he could walk for some distance treading all the time on *S. pumila*. W. T.

On *Furcellaria fastigiata*, &c. At Youghal, Miss Ball.* Ballysodare Bay, Co. Sligo, Mrs. Hancock. Magilligan, Mr. Hyndman. Ballantrae, Ayrshire, and Fresh-water Bay, Isle of Wight, W. T. Foreign specimens are in my collection from California, Cape of Good Hope, and Van Diemen's land.

April 14th, 1841.

It not only grows abundantly on *Fuci* attached to large stones between tide-marks at Cultra, but the entire otherwise bare side of a huge stone is bearded with it. *Fuci* however droop over the side of the stone from above, rooted on the top of the stone.

S. pinaster, Ellis.

This species, exactly as represented by Ellis, and bearing vesicles, was dredged at the entrance to Belfast Bay, by Mr. Hyndman, who has obtained it by similar means from a depth of 40 fathoms near Sana Island, on the Scotch coast, both in 1841 and 1842, but on both occasions the few specimens were without vesicles, as was likewise a specimen dredged by Capt. Beechy, R. N., off the Mull of Galloway, at the depth of from 110 to 140 fathoms. In some cases a single plume, in others several, spring from the same base. The branches are more produced than represented by Ellis and Solander, and in one instance secondary branches are thrown out, as we see in luxuriant specimens of its near allies, *Sert. abietina*, and *S. filicula*. Dr. Hassall's *Sert. Margarita* seems to me only a variety of this, differing in the vesicles. Specimens of the form he de-

* In whose collection are specimens from this locality in a free branched state, not adherent to any other object.

scribes were collected in Dublin Bay, in 1834, by Prof. Harvey, and sent to me at that time along with many other Zoophytes. They were at once laid aside as examples of a species unrecognised as British, until a leisure opportunity should arrive of studying the beautiful tribe to which they belong.

S. tamarisca, Linn.

This species must have been accidentally omitted from Mr. Templeton's Catalogue, as I find a named specimen in his collection with the locality, "Belfast Lough," attached to it. A single example was once found by Dr. J. L. Drummond, at Ballycastle, Co. Antrim. On an inspection of the fishermen's trawl-nets at Howth (Co. Dublin) in April, 1835, a very few specimens of *S. tamarisca* were found by Dr. Ball and myself, amid a profusion of other species: a plume or two of it has generally occurred to me among masses of other species at Portmarnock on the same coast. It would seem to be very sparingly produced anywhere. W. T.

S. abietina, Linn.

Dublin Bay, common, 1834, Prof. Harvey.
Coasts of Down and Antrim, W. T.
Youghal, Miss Ball. From the northern, eastern, and southern shores, I have seen examples of this species, those obtained from the fishermen's nets at Howth, in 1835, being remarkably fine.

S. filicula, Ellis.

In Dr. J. L. Drummond's collection is a specimen of this coralline obtained many years ago near Ballycastle by that most distinguished botanist, R. Brown. Bangor (Down), Sept., 1835, and subsequently, W. T.
This species is particularly partial to the clam-shell (*Pecten maximus*), on which, from various localities on the coasts of Down and Antrim, I have found it growing. On old oyster-shells dredged in 3½ fathoms water in Belfast Bay, Mr. R. Patterson. Attached to *Flustra foliacea*, collected at Magilligan, by Mr. Hyndman, and on *Flustra truncata* sent me from Portpatrick, in 1837, by Capt. Fayrer, R. N. On *Venus Islandica*, dredged at Dalkey, Dublin Bay, 1840, W. T.
March, 1843.—I observed several single stems growing from an old musket dredged off the Gobbins. Several specimens attached to a piece of limestone (bored by *Spio calcarea*) dredged in Belfast Bay, Nov., 1846.
Feb., 1848.—I obtained it on oysters from Clew Bay.

S. operculata, Linn.

Down and Antrim coasts, abundant, generally found on the stems of *Laminaria digitata*. I have obtained a few specimens of a black, as well as many of a red, hue. Magilligan, Mr. Hyndman, specimens from which, very large, attaining 6 inches and upwards in height. Ballysodare Bay, Co. Sligo, Mrs. Hancock. Youghal, Miss Ball.

S. argentea, Ellis.

Dublin Bay, Prof. Harvey, 1834. Magilligan, Mr. Hyndman. Antrim and Down coasts, grows occasionally in brackish water and shallow pools; a mass of it was once brought to me from one of the flood-gates to a dock in Belfast, on which it had grown. I once found it plentifully attached to dead mussels in a shallow pool in Dundrum Bay (Co. Down), into

which a river flows. All the finest specimens which have come under my observation were from deep water, on the coasts of Dublin and Londonderry. Ballysodare Bay, Co. Sligo, Mrs. Hancock; Youghal, Miss Ball. At Newcastle, Co. Down, 1851.

I found it very large, rooted to the sandy gravel within Dundrum Bay, at the edge of low-water mark, but where left dry at every ebb.

S. cupressina, Linn.

Belfast Bay; Howth, Co. Dublin, 1835, W. T.

Ballysodare Bay, Co. Sligo, Mrs. Hancock.

Clew Bay, 1840, W. T. Portpatrick, Capt. Fayrer, R. N. This and the preceding, with many other smaller species, constituted the most beautiful collection of Zoophytes I ever beheld when gracefully depending from and interlacing the spacious trawl-nets of the Howth fishermen as they were hung up to dry; some specimens of *S. cupressina* and *S. argentea* attained almost two feet in height.

Genus THUIARIA.

T. thuia, Flem.

Northern coast of Ireland.

T. articulata, Ellis.

Dublin Bay, Dr. Ball, 1839. On examining a number of the clam-shells (*Pecten maximus*) dredged near Donaghadee, I found a specimen of *T. articulata* adherent, and have received a specimen on a *Pecten opercularis* from the Isle of Man (E. Forbes), W. T. Numerous specimens from the Bootle coast, near Liverpool, were sent me in 1840, by Mr. Henry Johnston of that town. Near Sana Island, on the western coast of Scotland, Mr. Hyndman dredged it in or about 40 fathoms water in 1841 and 1842; in the latter year in same quantities, and the specimens remarkably fine, some of them greatly branched, spreading out to 6 inches, and one example has attained the height of 10½ inches. It is a deep-water and I should think rather local species, but often plentiful where it does occur. The pinnæ are alternate in the specimens alluded to.

Genus ANTENNULARIA.

A. antennina, Flem.

This species either in a simple or branched state is found around the coast of Ireland. The *simple form* attains a great size in Dublin Bay, specimens which I collected there in 1835 having exceeded 12 inches in height. Youghal, Miss Ball. Strangford Lough, W. T. Dredged from about 40 fathoms near Sana Island, Mr. Hyndman.

(*A. arborescens*, Hass.)

The *branched form* is found in Belfast Bay, Killery Bay, Connemara, W. T., and Dublin. It may be worth mention that the branched form is assumed by the species in Belfast Bay; the simple in the neighbouring Lough Strangford, as exemplified in numerous specimens dredged by my scientific friends and myself in both localities. Both forms have been dredged outside the entrance to Belfast Bay by Mr. Hyndman, May, 1842.

Genus PLUMULARIA.

P. falcata, Lamx.

Dublin Bay, Prof. Harvey, 1834. Down and Antrim coasts, W. T.

Magilligan, Mr. Hyndman: here and on the Dublin coast it grows most luxuriantly, occasionally attaining a foot or a little more in height; and is often densely branched, in which state, and when uninjured, it is a very beautiful object.

Clew Bay, W. T. 1840.

P. cristata, Lamx.

Youghal, Dublin Bay, Miss Ball. Waterford coast, Miss A. Taylor. Ballysodare Bay, Co. Sligo, Mrs. Hancock. Down and Antrim coasts, Alum Bay, Isle of Wight (in profusion, Sept. 1841), W. T.; all my specimens from these localities are on *Halidrys siliquosa*. *A. Plumularia* in my collection, obtained at California by Dr. Sinclair, seems in every respect identical with native specimens of *P. cristata*.

P. pennatula, Ellis and Soland.

Specimens of this rare and beautiful species profusely invest about six inches of the stem of a *Laminaria digitata* obtained in a fresh state by Miss M. Ball at Youghal in 1837. It must rather, I presume, have been owing to the East Indies being the locality whence the specimens described by Ellis and Solander were brought, than to any fault in Fleming's description (which seems as good as one so brief could be), that led some authors on the continent to attribute it to other species. The Irish specimens correspond with the descriptions in the works of Ellis and Solander, Fleming and Johnston, and with the figures in the first and last—some of them are 4½ inches in height.

Found also at Roundstone by Mr. M'Calla.

Dec. 29, 1851.—I saw a very fine group of this species to-day in Miss Ball's collection. It, with several other groups, was found at Ballycotton (Co. Cork) in August last by Miss Gaggin. The piece I saw appeared attached to the stem of a common *Laminaria* (tangle).

P. pinnata, Lamx.

In Mr. Templeton's collection there are specimens of this *Plumularia*, although it is not recorded by him. Dredged in 8 fathoms water in Belfast Bay. Dublin Bay, 1834, Prof. Harvey. Youghal, Miss Ball. Fine specimens, from 4 to 6½ inches in height, dredged upon the same day (June 15, 1842) in Red Bay, Co. Antrim; and about Sana Island in 40 fathoms, on the neighbouring coast of Scotland, where very fine specimens were dredged by Mr. Hyndman.

My specimens, with vesicles and agreeing in all respects with Dr. J.'s *S. pinnata*, except in three branches springing from each joint, I find is perfectly identical with the fig., Dr. Ellis, Coral., pl. xi. fig. A., in having only one pinna springing from each joint.

P. setacea, Lamx.

Antrim and Down coasts, Clew Bay, Co. Mayo, W. T. Ballysodare Bay, Co. Sligo, Mrs. Hancock. Glendore, Co. Cork, Prof. Allman. Specimens in Mr. Hyndman's collection, dredged at Donaghadee, July 12, 1842, are remarkably fine. They densely invest the stem and main branches of a specimen of *Halidrys siliquosa*, throughout about a foot of its length, and from every plume throughout the mass issues a series of vesicles closely placed together from the base to near the summit; these vesicles generally, if not always, spring from the upper side of the stem. Among Zoophytes given me by the late Archibald Menzies, Esq., were

specimens of *P. setacea*, brought up in the trawl-net in the Gulf of Mexico, from 30 fathoms water, June 1, 1801.

P. myriophyllum, Lamx.

Youghal, Miss Ball. Isle of Man, Prof. Forbes. A specimen dredged from 40 fathoms water, at Sana Island, Mr. Hyndman, W. T.

P. frutescens, Flem.

Youghal, Miss Ball, 1836. Dublin Bay, Dr. Hassall.

Genus LAOMEDEA.

L. dichotoma, Lamx.,

Is found around the Irish coast, attaining to a great size on that of the Co. Dublin. Of numerous specimens obtained in the fishermen's nets at Howth, in April, 1835, some reached to the height of 18 inches, and were besides beautifully and profusely branched. Ballantrae, Ayrshire, W. T. Dredged from 40 fathoms at Sana Island by Mr. Hyndman, W. T. Youghal, Miss Ball. On an *Aporrhais pes-pelicani* dredged at Bangor, in 5—6 fathoms, July, 1846.

Laomedea geniculata, Lamx.

Clifden, Connemara, W. T.

Specimens are before me from the North, East, and South coasts of Ireland. It is very common on Algæ; occasionally on *Zostera marina*. The Algæ preferred are the *Halidrys siliquosa* and the fronds of *Laminaria digitata*, and very different does the imperfect state of the *Laomedea* appear on the two plants. In the former the roots, if so they may be called, twine round the stem and vesicles of the sea-weed; on the broad leaves of the tangle, its first state is occasionally a regular piece of network, though the meshes are of various size, junction of the meshes apparently tied in a knot (as it were by fairy fingers), from these knots in due time spring the Zoophytes known as *Laomedea geniculata*.

L. gelatinosa, Lam.

Youghal, Miss Ball; Bangor, County Down, Oct. 1835, W. T. In the ordinary state parasitical on *Zostera marina* in both localities. Miss Ball has likewise obtained specimens presenting the finest state of the species, and 11 inches in height.

Prof. Allman has found it at Courtmasherry Harbour, Co. Cork.

Genus CAMPANULARIA.

C. volubilis, Lamx.

Dublin coast, 1835; Belfast Bay, on various Zoophytes and Algæ; of the former *Sertularia abietina* and *Plumularia falcata*, and of the latter *Halidrys siliquosa*, are favourites. On the broad leaves of *Delesseria sinuosa*. Donaghadee, Mr. Hyndman. Courtmasherry Harbour, Co. Cork, Prof. Allman. Freshwater Bay, Isle of Wight, W. T. Commonly invests *Sargassum* from the Mar de Sargasso in my collection.

C. syringa, Lam.

Of this species, which has not a place in Mr. Templeton's published catalogue, I find specimens labelled "Belfast Lough" in his collection—to myself it has occurred on the coasts of Down and Dublin.

C.? dumosa, Flem.

On *Tubularia indivisa* at Youghal, 1836, Miss Ball.
On *Serialaria lendigera* and various corallines in Belfast Bay, W. T. Dublin Bay, Dr. Ball, Sept., 1839. Bootle coast, Liverpool, from Mr. Henry Johnston. Adherent to a stone from Strangford. Dredged in about 40 fathoms water at Sana Island, by Mr. Hyndman, parasitic on *Thuiaria articulata*. Youghal, Miss Ball. Parasitic on various zoophytes; among others I have seen the delicate *Serialaria lendigera* covered with its tubes. Invests the upper portion of shells of the *Dentalium entalis*, dredged with the animals living in Strangford Lough, July, 1838, W. T.

C. verticillata, Lamx.

Found commonly thrown ashore at Portmarnock, in 1835, and subsequently more rare, but of occasional occurrence in deep water in Belfast Bay, W. T. Magilligan, Mr. Hyndman. Courtmasherry Harbour, Prof. Allman, W. T.

C. integra, Macgill.

North of Ireland.

Genus HYDRA.

H. viridis, Linn.

East and South of Ireland.
Obtained at Bandon (Co. Cork), by Prof. Allman.

H. vulgaris, Pall.

North, East, and South of Ireland. August 20, 1846, I saw in a glass globe—such as gold fish are kept in—half filled with water, in Mr. Hyndman's house, about twenty living *Hydræ*, which were obtained by him in May last, from the pond in the Zoological Gardens, Dublin, a locality previously known by Mr. Callwell as frequented by the species. Not one of these specimens showed any attenuation below, and hence are not *H. attenuata* or *H. oligactis*. The tentacula are not "shorter than the body," hence they are not *H. viridis*. They were longer than the body and six in number in all the specimens, as I saw them displayed. The colour of the body is a very pale reddish-brown. When the body is fully extended, nearly 6 lines long, or 5 lines certain. The tentacula are of about the same length, but when not so (and this was the case in all but one specimen) they were considerably longer (5 lines).

Hydra. See Johnston's Zoop., p. 131, 2nd edit. Effect of, on *Limneus peregер*—Sept. 1846. Mr. Hyndman observing a *Limneus* moving towards a *Hydra* fixed on the side of a glass globe half filled with water, remarked that the moment the tentacula of the *Limneus* touched the arms of the *Hydra*, the Mollusc suddenly drew back and changed its course. The *Hydra* did not draw in its arms. On a subsequent occasion, Mr. Hyndman observed a *Planorbis marginatus* (under half size) moving towards a *Hydra*, and on coming in contact with its body, the Mollusc was not affected, but endeavoured to move onwards, at risk of displacing the *Hydra*; this species, however, kept its ground, and the *Planorbis* moved off in the direction of its arms, which were no sooner touched than it also, like the *Limneus*, suddenly drew back, and moved in another direction. The re-

pulsive power of the *Hydra* would thus seem to exist in its tentacula, and not in its body.

H. fusca, Linn.
East of Ireland.*

H. verrucosa, Temp.
North of Ireland, Mr. Templeton.
Supposed identical with *H. fusca*.

ORDER ASTEROIDA.

Genus VIRGULARIA.

V. mirabilis, Lam.

Still to be had by dredging about Bangor, Belfast Bay, W. T.

April 3, 1848.—A few fine specimens reaching to 7 inches in length, dredged from 5 fathoms in Belfast Bay, by Edm. Getty, Esq., and brought me.†

Genus GORGONIA.

G. anceps, Pall.

Stated by Ellis as found on Irish coast.

G. verrucosa, Linn., Johnst. Brit. Zooph.

The first *Gorgonia* of any species which I have seen from the coast of Ireland, was a portion of *G. verrucosa* sent to me by Dr. Ball. The specimen was procured at the island of Lambay, off the Dublin coast, and taken to Mr. Warren by the man who found it, on account of the size (18 inches from base to extremity of branches), he having never seen any so large before.‡ West of Ireland, R. Ball.

Genus ALCYONIUM.

A. digitatum, Linn.

Common on the coasts of Down and Antrim.

Unattractive as this species is when dead, it is a highly beautiful object in a living state when the polypes freely display themselves. W. T. Sept. 27, 1847, Mr. Hyndman dredged from 20 fathoms at entrance to Bel-

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* Plentiful in the lower pond of the Belfast Botanic Garden.—ED.

† Twenty-four specimens, some of them above 8 inches in length, were obtained in our presence at one haul of the dredge off Rock-port, Belfast Bay, June 9th, 1855.—ED.

‡ This has been inadvertently called *Gorgonia flabellum* in the published list of donations to the Dublin University Museum, Dec., 1848, p. 8. A specimen of *G. flabellum*, with the root attached, was brought up in a trawl-net from 8 to 10 fathoms depth off Bangor, Belfast Bay, last summer, by Mr. Hyndman, who judiciously considered it a foreign specimen. That it had for some time been a denizen of our seas was, however, evident from the native productions which were attached, such as *Crisia eburnea*, *Cellularia ciliata*, *Grantia compressa* and *G. ciliata*, *Serpula triquetra*, with small portions of *Conferva* and other native Algæ. This *Gorgonia* was 14 inches in height and the same in breadth.

fast Bay (bottom shelly sand), attached to large bivalve shells of various species, the *true* "dead man's hands," or "dead man's toes," the first time that I remember to have seen it from our N. E. coast. All the other specimens that I have seen—and they are very commonly taken everywhere by dredging—were the orange-coloured variety or species, which was likewise taken to-day. All of the innumerable specimens of this latter that I have seen were of an orange colour, they were also in form when large much more attenuated and irregularly branched than the true form obtained to-day. This is just the colour of dead men's hands and toes. An examination should be made, as to whether they be of the same species.

Couch's *Al. sanguineum* is of this form, of the orange variety common here; his *A. digitatum* of the other. See his pl. 13, for both.

A. glomeratum, Hassall.

Dublin Bay, Dr. Hassall.

Genus SARCODICTYON.

S. catenata, Forbes.

Dredged in deep water at Youghal, Dr. Ball.

Feb. 1848.—On a stone dredged off Whitehead, County Antrim, at base of a mass of *Tubularia indivisa*. A few individuals only, and not joined or catenated. Roundstone, Mr. M'Calla.

ORDER HELIANTHOIDA.

Genus TURBINOLIA.

T. milletiana, Defrance.

This species, only known as fossil until Mr. M'Andrew dredged it alive off the coast of Cornwall in the spring of 1845, was obtained by similar means off the Isles of Arran (Galway Bay) in the summer of that year by Mr. Barlee.

Since this note was taken, the Irish station has been published in the 2nd edit. of Johnston's "Zoophytes."

Genus CARYOPHYLLIA.

C. Smithii, Stokes.

A few specimens were procured at Youghal, by Miss Ball, in April, 1836, and subsequently—diameter of the largest 7½ lines.

Bundoran, Co. Donegal, Dr. Ball.

Nov. 1849.—Mr. T. W. Warren showed me a quantity of these (part of half a pint), and gave me some of them, which were brought him about four years ago by a fisherman from the Nymph Bank, whence Dr. Ball had them in 1819.

Genus CORYNACTIS.

C. viridis, Allman.

Crook Haven, Co. Cork, Prof. Allman.

C. Allmani, Thompson.

A species of *Corynactis*, differing considerably from *C. viridis*, Allman (Ann. Nat. Hist., vol. xvii. 417, pl. 11), has been procured by dredging in Belfast Bay and Strangford Lough (15 to 20 fathoms). It is somewhat doubtfully on my part given as specifically distinct from *C. viridis;* but Professor Allman, to whom a specimen was submitted in a living state, considers it to be so.

Spec. Char.—*C.* with several regular concentric series of capitate tentacula, those of the third and fourth rows being about equally regular and numerous as those of the two outer rows; those nearer the mouth irregularly disposed.

The colour—red of various shades—is wholly different from that of *C. viridis*, though not included in the diagnostic characters.

Genus ZOANTHUS.

Z. Couchii, Johnston.

(*Dysidea? papillosa*, Johnst. Brit. Sponges, p. 190, pl. 16. fig. 6.)

This species, dredged from a depth of 15 to 20 fathoms in Strangford Lough, on the 22nd June, 1846, by Mr. Hyndman and myself, was brought home in a living state, and proved on the expansion of its tentacula to be a Helianthoid Zoophyte. It was then noted as—"coming very near *Zoanthus*, Cuv. (Règ. Anim., vol. iii. p. 293, edit. 1830), if indeed it should be generically separated from it. The character of each individual rising from a common base does not apply to it, and the generic character must consequently be either altered to suit the species, or this be constituted a new generic form." Other observations made at the same time are now unnecessary (as the sequel will show); the preceding note is given merely with reference to one on this subject at p. 252, second edition, British Zoophytes.

When on board Mr. M'Andrew's yacht at Southampton, Sept., 1846, Professor Forbes pointed out to me living specimens of *Zoanthus Couchii* (according to the Cornish Fauna) which had been dredged off the southern coast of England, and these to my surprise proved to be the same species as I had obtained.

All the specimens named *Z. Couchii*, that I had previously seen, were the very different *Sarcodictyon catenata*, Forbes (Johnst. B. Z., p. 179,* pl. 33, figs. 4—7, 2nd edit.). On referring to Couch's work, I agreed with my friend about the identity of the species, which, being certainly the same as that from Strangford Lough, decided, at least to my mind, the question that *D.? papillosa* and *Z. Couchii* are not distinct. Dr. Johnston, not having seen the living animal, placed his *D. papillosa* doubtfully among the sponges. In doing so he judiciously remarked, that it is nearly allied to the *Alcyonium ocellatum* of Ellis and Solander, Zoop., p. 180, tab. i. fig. 6; and it is probable that the two productions are of the same nature, whatever this may be."—*Brit. Spong.* p. 191.

This species was dredged by us in Strangford Lough in 1835, as noticed in the Annals (vol. v. p. 254). It was, as on the last occasion, found adherent to dead bivalve shells—*Venus aurea, V. ovata, Corbula striata.* The figure referred to in the British Sponges represents the species from this locality.

* Dr. Johnston has here (p. 180) correctly brought the Youghal species under this—it is the *Zoanthus Couchii* of my Report.

Genus ANTHEA.

A. cereus, Johnst.

In September, 1835, I made a note of this species as being the most common *Actinia* of Ballyholme Bay (Co. Down), where it was gregarious, forming in some places a continuous fringe round large rock-pools and stones, exposed to view at low water. In such quantity it is not now to be seen there, having become gradually scarcer since the period mentioned. In Dublin Bay and on the western coast this species likewise prevails. It is commonly of a dull ash-colour throughout, but wherever I have remarked it, some few individuals were to be found of a green colour, with the tentacula partially or wholly red. The *A. cereus* is doubtless one of the species mentioned under another name by Mr. Templeton as found at Ballyholme Bay (Mag. Nat. Hist., vol. ix. p. 303), but in uncertainty which of his should be referred to, I have thought it better to notice the subject again.

I once saw it literally fringing, without a single gap, a small rock-pool about five yards long with their fully expanded tentacula; the specimens were very large, one of them, the largest I had ever seen, was 6 inches in diameter from point to point of the opposite tentacula. They were all of the ordinary dull hue throughout.

Genus ADAMSIA.

A. maculata, Johnst.

This extremely beautiful species, taken by dredging at Strangford Lough, in January, 1835, by Mr. Hyndman and myself, has subsequently occurred to us commonly there and in Belfast Bay—to *Bulla lignaria* as well as the larger *Trochi* it is occasionally found attached. Every shell that I have seen the *A. maculata* invest was tenanted by the *Pagurus Prideauxii*, Leach, a species which, extensively as the native *Paguri* have been collected by me, never occurred under other circumstances.

On the Waterford coast, investing dead shells (inhabited by *Pagurus Bernhardus*) of *Buccinum undatum*, Dr. Farran.

Genus ACTINIA.

A. mesembryanthemum, Ellis.

Common around the shores of Ireland, where the different seasons of the year have no effect that ever I could observe upon its colours (see Brit. Zoop., p. 212).

A. margaritifera, Templeton.

Copeland Isles (mouth of Belfast Bay), August, 1811, Mr. Templeton. West side Donegal Bay, Prof. Forbes.

A. viduata, Müll. Zool. Dan.

Observed between tide-marks at Lahinch (Co. Clare) by Prof. Forbes and myself.

Bangor, Co. Down, July 4, 1836, G. C. H. and W. T.

I found two very small specimens attached to a stone between tide-marks; their colour was an olive green, with the stripes pure white from base to apex, and between the main stripes, when wider than usual, short white rays shot from the base a short way upwards. These specimens were quite free from sand, and seemed not to differ from *A. mesembryanthe-*

mum, except in colour. This latter species is, as Dr. Johnston states of England (Brit. Zoop., p. 212, 1st edit.), of all the respective colours in summer that they are in winter.

A. coccinea, Müll.

West coast of Ireland, Prof. Forbes.

A. bellis, Ellis.

I have taken this beautiful species in Ballyholme Bay, Co. Down. It is admirably represented by Gærtner in Phil. Trans., vol. lii. tab. 16, f. 2, A. W. T.

"Island of Rathlin, August, 1795," Templeton.

A. gemmacea, Temp.

Vide Templeton in Mag. Nat. History, vol. ix. I can add nothing to this but that very large examples, 3 inches in diameter, are occasionally taken with the dredge in deep water on the coasts of Down and Antrim.

Dec., 1842.—A corked quart bottle, with only a small bit broken out of the side, was found to-day in the stomach of a cod in Belfast market, and brought to me by a trustworthy fish-vender who "extracted" it. The peculiar mucus indeed with which the bottle was invested sufficiently denoted its late "whereabouts." Were the cod sold by weight here (which it is not) it might be supposed that the bottle had been introduced dishonestly to add to the profit of the salesman. However, if the fish did swallow the bottle, its magnet of attraction was evident, in the shape of a a large *Actinia*, apparently of this species, which was based on the glass to which it still closely adhered. Its base was very irregular in shape, and occupied about 3 inches in diameter. The entire surface of the *Actinia* was smooth. The bottle had been a very short time in the stomach of the fish, as some of the *Serpula* on it were still alive. W. T. Springvale, Down, July 16, 1846.—I saw one on the beach between tide-marks, as I have done between Ballyholme Bay and Groomsport; the body was deep red; the tentacula beautifully annulated with pale red and hyaline alternating. Oct. 3, 1846.—A small specimen dredged, adherent to a stone from upwards of 20 fathoms, about the entrance to Belfast Bay; colour delicate orange red; tentacula ringed with same colour and hyaline. Among the *Zoophytes* obtained on the same occasion, are *Sertularia tamarisca*, *Campanularia verticillata*, *Cellepora ramulosa*.

A. dianthus, Ellis.

Belfast Bay, Dr. Drummond; Edm. Getty, Esq., Strangford Lough, W. T. Amongst the various forms it assumes, I have seen this species present the exact appearance of the *Act. plumosa* of the Zoologia Danica. Mr. Templeton marks it with doubt as Irish.

April 22, 1848.—A fine specimen of this—or rather than *A. dianthus*, Johnst., precisely of *A. plumosa*, Müll. Z. D., vol. iii. p. 12, t. 88, f. 1, 2—dredged yesterday by E. Getty, Esq., in Belfast Bay, was brought me alive. It adhered to a large *Modiola vulgaris*, and was when fully expanded about 4 inches in length. It is of a rich creamy flesh-colour, and was vigorously alive after being 48 hours out of the water, when I put it in spirits.

Genus ILUANTHOS.

I. scoticus, Forbes.

On the beach at Balbriggan, after a storm, March, 1843, Mrs. Hancock.

Genus LUCERNARIA.

L. fascicularis, Flem.

Donaghadee, Mr. Templeton.

L. auricula, Fabr.

I once found two examples of this species attached to a *Polysiphonia* collected at Carnlough, Co. Antrim, by Dr. J. L. Drummond. W. T.

L. campanulata, Coldstream.

Miltown Malbay, Professor Harvey.
West coast, on *Fucus tuberculatus*, Mr. Andrews. Bray, R. Ball.

ORDER ASCIDIOIDA.

Genus SERIALARIA.

S. lendigera, Lam.

Found on the North, East, and South coasts of Ireland. In Belfast Bay and at Ryde, Isle of Wight, I have observed that it is equally partial to *Halidrys siliquosa* as a base. Occasionally on Zoophytes, as *Notamia loriculata*, &c. W. T. Youghal, Miss Ball.

Genus VESICULARIA.

V. spinosa, J. V. Thompson.

I have seen specimens from the North, East, and West coasts of Ireland. The species, like indeed all our Zoophytes, attains a much greater than ordinary size on the Dublin coast.

Genus VALKERIA.

V. cuscuta, J. V. Thompson.

This species, although little known, is by no means rare. Dublin Bay, 1838, Miss Ball. Ballysodare Bay, Co. Sligo, Mrs. Hancock. Magilligan, Co. Londonderry, Mr. Hyndman. In Belfast and Strangford Loughs, on various Algæ, but more especially on *Halidrys siliquosa*, which superlatively bears the palm as the favourite of the Zoophytes.

V. Uva, Flem.

North and East of Ireland.
Adherent to *Flustra foliacea*, dredged 20 fathoms, Belfast Bay, Sept., 1847, G. C. H.

V. pustulosa, Johnst.

Belfast Bay, W. T. Dublin Bay, Dr. Hassall. Youghal, Miss Ball.

Genus BOWERBANKIA.

B. densa, Farre.

When shown this Zoophyte by Dr. Farre in the spring of 1837, I re-

cognised it as a species which had not uncommonly occurred to me on the North-East coast, attached, in the form of minute tufts, to the stems of *Desmarestia aculeata*, *Furcellaria fastigiata*, &c. I once procured it from the under side of a stone in Belfast Bay.

Youghal, Miss Ball.

B. imbricata, Johnston.

Obtained around the coast of Ireland. The first time I gave any attention to this species, *in situ*, was in Clew Bay (Co. Mayo) in July, 1840, when it was obvious that *Bowerbankia densa*, which appeared in quantity along with it, was only its early state. I remarked the same in Roundstone Bay soon afterwards. I was not aware at this time that any other naturalist had come to the same conclusion. W. T.

Genus LAGENELLA.

L. repens, Farre.

In January, 1835, this occurred to me in Strangford Lough, but I was unable to identify it with any described species. Dr. Farre's excellent memoir, which appeared in the Philosophical Transactions for 1837, supplied this want; and since that time I have, by the examination of the living polype obtained in the locality just named (and on the same species of Algæ as the *B. densa*), ascertained to a certainty its identity with *B. repens*.

Genus PEDICELLINA.

P. echinata, Sars.

North, East, and South of Ireland.

Genus CRISIA.

C. cornuta, Johnston.

On Algæ from the island of Ireland's Eye, Dublin coast, 1837, Miss Ball. Down and Antrim coast, on various Algæ, more rarely on Zoophytes. Killery Bay, Connemara, W. T.

C. eburnea, Lamx.

Common on Algæ and Zoophytes around the coast of Ireland. Clifden, Connemara, W. T. Youghal, Miss Ball.

C. luxata, Flem.

Attached to the base of various Algæ collected near Glenarm, by Miss Davison, in 1833. Youghal, Miss Ball. Waterford coast, Miss A. Taylor.

C. aculeata, Hassall.

On *Pecten maximus*, dredged on the Antrim coast, Mr. Patterson. Strangford Lough, Oct., 1839, W. T. Kingstown Harbour, Dr. Hassall.

Genus TUBULIPORA.

T. patina, Lam.

On *Cellepora cervicornis*, &c., from the southern coast, in Dr. Ball's collection. North-East coast, W. T. Dublin Bay, 1837, Miss Ball.

Var. *T. bellis*, Thomp. See W. T.'s description in Johnston's Zoop., p. 267. The *Tubulipora* are subject to such variety that I fear to call this a

new species. It forms snowy white circular patches of various size (but generally about 3 lines in diameter) on *Zostera marina*, in Strangford Lough, where I first obtained it in January, 1835.

T. bellis may be likened to the central portion (omitting the raised marginal tubes) of *Tub. patina* of the British Zoophytes set within a broad white circular rim, which is perfectly flat, instead of being raised or saucer-like.

T. hispida, Flem.

Not uncommon on marine plants and shells in the North and South. Down and Antrim coasts, on shells, Zoophytes, and stones; but chiefly on Algæ such as the *Delesseriæ* and *Nitophyllæ*, occasionally even on the filiform *Griffithsia setacea*. On a plant of this species I have an interesting specimen, in which, as if for want of room to fully expand itself, the polypidom assumes the form of a double circle, and the marginal base folds in, so that taken altogether we have somewhat the appearance of the scroll or volute of an Ionic pillar, the lines thus marking the form which the margin assumes. On *Cellepora cervicornis* from the Nymph Bank, in Miss Ball's collection. On various species of Algæ in my Herbarium, from Van Diemen's Land, W. T. I possess ova of dog-fish (*S. canicula*) with fish not excluded, having a full-grown *T. hispida* on it.

T. serpens, Linn.

Common around the coast of Ireland, adherent to flexible Zoophytes (*Sertularia abietina* being a favourite), shells (especially within old bivalves), stones, and Algæ (even on the filiform species, as *Griffithsia setacea*, &c.), W. T. After an examination of very numerous examples of this species on the variety of bases just mentioned, I feel satisfied that the objects figured in the Annals of Nat. Hist., vol. vi. pl. 6, figs. 3 and 4, as *Tub. verrucaria*, and in the same work, vol. vii. pl. 10, figs. 1 and 2, under the name of *Tub. lobulata*, are merely *T. serpens*. *T. lobulata*, with its six arms or expansions, should, I conceive, be regarded simply as a very aged individual which had lived long enough to describe a circle with its arms. Specimens are before me with one, two, three, and four expansions of a similar nature in all respects to the six of *T. lobulata*.

By reference to Mr. Templeton's specimens, I find that his *Pherusa tubulosa* (Mag. Nat. Hist., ix. p. 469) is the *Tubulipora serpens*, Flem. (*T. transversa*, Lam.)—This species, it will be recollected, was the *Millepora tubulosa* of Ellis and Solander.

T. obelia, Johnst.,

Obtained with the specimens from Kinsale, have been noticed by Dr. J. E. Gray, but the species being considered rare, a second and northern habitat is given.

On *Pinna* from the coast of Cork. *Pectunculus pilosus* from Magilligan, Co. Londonderry, W. T.

T. flabellaris, W. Thompson.

The delicate, smooth, and somewhat hyaline specimens which I obtained on the beach at Bangor, Co. Down, in 1833, and subsequently dredged in the Loughs of Strangford and Belfast, are regarded by me as identical in species with the large greyish-white rugose form (in some specimens the tubes are even ridged across) procured on the open coast of Down, at

Ballywalter. Examples precisely similar to the latter are on Algæ in my collection, from Van Diemen's Land. Our species of *Tubulipora* are so widely diffused over the seas of the globe, and have met with such attention from naturalists, that I cannot believe this form to be peculiar to our latitudes, or to have hitherto escaped detection. I cannot however refer it with certainty to any species. It may be the *Tubipora flabellaris* of the Fauna Grœnlandica, p. 430, but the inapplicability of the word "parallels" to the tubes renders this doubtful. Risso's brief description of *Discopora palmata*, t. v. p. 339, applies tolerably to it. The chief difference between *T. plumosa* and *T. serpens* when adherent to an expanded surface is, that the former emanates generally from a single stem or tube, is broadly plumose, has the tubes curved and much elongated, and not disposed more or less in the regular series in which they appear in *T. serpens*. See figures for those differences. Occasional departures, however, from the typical form of *T. plumosa* suggest the possibility of its being another of the Protean forms of *T. serpens*. How happy this trivial name, in the poetical sense at least, of the serpent assuming a variety of forms! W. T.

Genus ALECTO.

A. granulata, Edw.

Found attached to stones and shells brought up from deep water in Belfast Bay, &c.

A. major, Johnst.

Adherent to old bivalve shells dredged outside the entrance of Belfast Bay, from the depth of 25 to 35 fathoms, in July, 1848, and sent to me by Mr. Hyndman.

A. dilatans, Johnst.

With last. I had previously noted this species or *form*—for I do not feel altogether satisfied respecting the specific distinctness of *A. major* and *A. dilatans*—as observed with other deep-water Zoophytes on a stone dredged from 40 fathoms off Whitehead, County of Antrim. Its three branches render this specimen more elegant than any of those figured by Johnston.

Genus EUCRATEA.

E. chelata, Lamx.

Dr. Johnston (Brit. Zoop.) notes this as Templeton's "*Loricula loricata*," by which name I have no doubt that *Notamia loriculata* (not otherwise given in Templeton's catalogue) was meant. Although I have thought it proper to allude to this, it is hardly worth correction, as Templeton's remark of "common on the coast of Ireland" applies equally to *E. chelata* as to *N. loriculata*.

Down and Antrim coasts, chiefly on other Zoophytes, sometimes on Algæ, 1835, W. T. Magilligan, on various Zoophytes, Mr. Hyndman. Dublin Bay and Youghal, on *S. argentea*, &c., Miss Ball. Clifden, Connemara, W. T. Glendore, Co. Cork, Prof. Allman. Ballysodare Bay, Co. Sligo, Mrs. Hancock.

Genus NOTAMIA.

N. loriculata, Flem.

Common on the North and East coasts of Ireland, and of a much larger size than the maximum—4 inches—given in Brit. Zoop., W. T.

Genus HIPPOTHOA.

H. catenularia, Flem.

This is very common on *Pinnæ* dredged on the coast of Cork, W. T. (On shells dredged in 40 fathoms water at Sana Island, West coast of Scotland, Mr. Hyndman.) (On a *Pholas dactylus* found at Compton Bay, Isle of Wight, W. T.) On *Buccinum Zetlandicum* taken on long lines in deep water at Bunowen, Co. Galway, Dr. Farran's collection.

January, 1848.—On stone dredged from 40 fathoms off Gobbins, Co. Antrim, a fine specimen of *Cellepora cervicornis* on same stone.

H. divaricata, Lamx.

This species is of much less frequent occurrence on the *Pinnæ* I have seen from the coast of Cork than *H. catenularia*, investing the roots of a small plant of *Laminaria digitata* found at Bangor, Co. Down, in 1835; subsequently obtained on *Solen fragilis*, and on a stone dredged in Strangford Lough, W. T. On a *Solen* dredged in Dalkey Sound, Dublin Bay, Dr. Ball, W. T., &c. On various shells (*Lima tenera*, *Pecten obsoletus* and *P. opercularis*, *Psammobia florida*, &c.) dredged from a depth of 40 fathoms, near Sana Island, by Mr. Hyndman. In this locality it is much more common than *H. catenularia*, W. T. Belfast Bay, on shells, Mr. Hyndman, 1844.

H. sica, Couch.

Found within a very large dead *Pinna* dredged at the entrance of Belfast Bay. Mr. Couch's description, but not his figure, is applicable to my specimen. The striking characters may be noticed. The length of the cells is, as described, "about four times their transverse diameter," and the apertures "are long and tubular, frequently as long as the cell." But whether this remarkable form may not be due to the security and freedom from injury enjoyed by the Zoophyte within the closed valves of the *Pinna*, I shall not, from the examination of a single specimen, pretend to determine. Mr. Couch's specimens were however procured "on stones, from deep water, common." But for this character (which probably may not be permanent) I should not enumerate my *Hippothoa* as distinct from *H. divaricata*, which too is described by Dr. Johnston as sometimes having the apertures "*shortly* tubular."

Genus ANGUINARIA.

A. spatulata, Lam.

This is stated in Mr. Templeton's catalogue to have been "found on the shore at Carrickfergus, on the sand, Aug., 1811."—Mag. Nat. Hist., ix. p. 466. The specimen labelled under this name in Mr. Templeton's collection is *Campanularia syringa*, but having "Belfast Lough" simply written on it, may not be the one published. Of the *A. spatulata* I possess specimens which invest the stem of *Dasya coccinea*, collected at Youghal by Miss Ball.

At Freshwater Bay, and Ventnor, in the Isle of Wight, I found it commonly investing various Algæ, as *Dasya*, *Plocamium*, *Sphacelaria scoparia*, *Griffithsia*, &c. Foreign specimens appear on Algæ in my collection from Trieste, "Briaritz, Atlantic Ocean," and Van Diemen's Land. W. T.

Genus CELLEPORA.

C. pumicosa, Linn.

Common around the coast of Ireland.

Springvale, July, 1846.—*Cellepora pumicosa*, found patches of, spreading over branches of *Ptilota plumosa*, W. T.

C. ramulosa, Linn.

Obtained at Youghal by Miss Ball. Portmarnock, 1835, W. T.

Small specimens have been dredged in deep water, Belfast Bay, by Mr. E. Getty and Mr. Hyndman; attached to flexible Zoophytes, as *P. falcata*, &c. May, 1843.—Dredged in from 8 to 10 fathoms at Donaghadee, by Dr. Drummond; adherent to *Sertularia abietina*.

C. Skenei, Ellis and Solander (sp.).

Among "corallines" taken in the trawl-nets in very deep water off the eastern coast of Ireland, and preserved in Miss Ball's collection, is a specimen of *C. Skenei* which was pointed out to me by that lady in May last. Dr. Johnston, in his British Zoophytes, p. 276, remarks—"Notwithstanding the apparent dissimilarity in habit of the three preceding *Cellepora* [*C. Skenei*, *C. ramulosa*, and *C. pumicosa*], I cannot but suspect that they are merely different states of the same species, for in these productions the 'fronti nulla fides' receives many an apposite illustration." This specimen tends to bear out the correctness of the view that the three forms are not specifically different: the form *C. Skenei* is rare; *C. ramulosa* not common; *C. pumicosa* abundant: this last may perhaps be considered the base of both the others. With this one specimen of *C. Skenei*, a good deal of *C. ramulosa* was taken of small size adherent to *Sertularia argentea*.

C. cervicornis, Flem.

Obtained many years ago in abundance from the Nymph Bank by Dr. Ball.

Dredged in Belfast Bay, Ordnance Collection (W. T., August, 1843). Roundstone, Mr. M'Calla. Youghal, Miss Ball.

Feb., 1847.—A very fine specimen attached to a stone dredged off Carrickfergus was sent to E. Getty, Esq. On the same stone was *Alecto granulata*, and attached to the *Cellepora* a beautiful tubular sponge, perhaps *S. limbata*, also *Serpula vitreæ*.

Genus LEPRALIA.

L. hyalina, Johnst.

Common on marine plants, &c., on the shores of Ireland from North to South.

Killery Bay, Connemara, on *Laminaria digitata*, W. T.

Common on Algæ around the coast of Ireland, looking especially beautiful from the purity of its colour on our fine red *Delesseriæ* and *Nitophyllæ*.

L. tenuis, Hassall.

Irish Channel, off Sana Island, Mr. Hyndman.

Dublin Bay, Dr. Hassall.

L. assimilis, Hassall.

On dead valves of *Pecten maximus*.
Dublin Bay, Dr. Hassall.

L. Hassallii, Johnston.

Dublin Bay, Dr. Hassall.

L. coccinea, Johnst.

This species first occurred to me of a snow-white colour, on the bark of a tree washed ashore at Bangor (Down) in January, 1834. On stones and shells dredged in deep water on the North-East coast, it was of the ordinary pale-reddish purple hue.

L. simplex, Johnst.

I find this very fine and well-marked species on old bivalve shells, *Modiola vulgaris*, *Pecten opercularis*, &c., dredged on the same occasion as *Alecto major*.

L. ventricosa, Hassall.

Dublin Bay, Dr. Hassall.

L. Hyndmanni, Johnst.?

As last. Marked with doubt on account of the specimens being much worn.
Found with *L. simplex* in deep water off the Copeland Isles.

L. ovalis, Hass.

Feb., 1848.—Adherent to *Cellepora cervicornis* growing on a stone dredged off the Whitehead entrance to Belfast Bay, in 40 fathoms water. Dr. Hassall considers it a very rare species, and obtained but one Irish specimen at Kingstown. I have but to add that my specimen is of a beautiful silvery-white hue, and most thin and delicate texture, that the *front portion of the aperture** rises up into a short process, usually bifurcate, and that from its hinder (distal, Dr. J.) spring two or three very long and delicate spines. See Johnston, p. 308. Johnston's fig. 1, pl. 56, represents my specimen well, but in it the spines are longer and more delicate, terminating in a sharp point.

L. linearis, Hassall.

Giant's Causeway and Kingstown Harbour, Dr. Hassall. Beaufort's Dyke, Capt. Beechy.

L. auriculata, Hassall.

Bray, Dr. Hassall.

L. punctata, Hassall.

Ireland, Dr. Hassall.

L. biforis, Johnst.

Adherent to stone dredged in 40 fathoms, Feb., 1848, off Whitehead, Co. Antrim, on which a broken piece of *Cellepora cervicornis* grows. See specimen on base of stone touching largest specimen, *Tubulipora obelia*.

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* "Upper lip," Johnst.

L. Peachii, Johnst.

Associated with *Alecto major*, Belfast Bay.

L. pediostoma, Hassall.

Dublin Bay, Dr. Hassall.

In masses attached to under side of stones in rock-pools. It covered for a few square inches the stone with a pinkish incrustation, which appeared very beautiful.

L. verrucosa, Esper (sp.).

Dublin coast, Miss Ball, 1837.

L. granifera, Johnston.

North of Ireland.

L. variolosa, Johnst.

On *Pinnæ* dredged at Cork, and favoured me by Dr. Ball, rare. I have obtained this species on the shell of the common edible crab (*Cancer Pagurus*, Leach) taken near the entrance of Belfast Bay.

L. immersa, Johnst.

On *Pinnæ* from Cork. North-East and Dublin coast, Mr. Hyndman and W. T.

L. nitida, Johnst.

On stones, &c., dredged in deep water at entrance of Strangford Lough; also in Belfast Bay.

L. ciliata, Johnst.

Common on marine plants, shells, &c., around the Irish coast.

Roundstone, Connemara, W. T. Shores of Down and Antrim, W. T. Magilligan, Mr. Hyndman.

L. innominata, var.? Couch (description, *not* figure), Johnst. B. Z., p. 319.

With *Alecto major*, &c.

L. semilunaris, Hassall.

On *Pecten maximus*, off Bray, Dr. Hassall.

L. unicornis, Johnston.

Adherent to a stone dredged from 5 fathoms at Donaghadee, in August, 1848.

L. Ballii, Johnst.

A very distinct species. With *Alecto major*, &c.

L. trispinosa, Johnst.?

Agreeing with the description (Brit. Zooph., p. 324, 2nd edit.) better than with the figure, in the aperture being "small and circular," &c. With the last.

L. appensa, Hassall.

Ballywalter, Co. Down, W. T.

L. spinifera, Hassall.

Dublin Bay, Dr. Hassall.

L. violacea, Forbes.

North of Ireland, Mr. Hyndman.

L. concinna, Busk, MSS.

North of Ireland, Mr. Hyndman.

L. labrosa, Busk. MSS.

North of Ireland, Mr. Hyndman.

Genus MEMBRANIPORA.

M. pilosa, Ellis.

Very common on Algæ, shells, and around the Irish coast.

Var. B, with the long bristle abortive, common also.

Ballantrae, Ayrshire; Freshwater Bay, Isle of Wight, W. T. Investing an Algæ in my collection from Van Diemen's Land, W. T. Youghal, Miss Ball. Var. *stellata*.

Stellata, or of a sub-stellate outline, cells without hairs or setæ.

Polypidom of a light sandy colour, incrusting the larger marine Algæ in somewhat of a stellate form; a few inches in diameter; aperture of the cells without hairs or bristles (like those of *M. pilosa* and *M. spongiosa*, Temp.), but beset with spines or denticles, varying much in number, one at the base generally exceeding the others in magnitude. Along the centre of each ray extends a series consisting of a few rows of oblong or roundish-oblong cells, on either side of which are transverse rows of square and roundish cells considerably larger than those which constitute the central portion; "parietes of the cells prettily punctured." This description applies to the species in its most perfect state. When the stellate figures coalesce—which they rarely do—so as to cover the surface of the plant, the form and arrangement of the cells, as just mentioned, are generally preserved. When deviations from this arrangement do occur, the general form of the Zoophyte is the most obvious character. This species first occurred to me in Belfast Bay, in September, 1833, when a quantity of tangle, *Laminaria digitata*, had been thrown ashore, on the broad leaves of which its stellate form at once arrested my attention. In Strangford Lough I similarly found it afterwards; and more recently in Scotland, near Ballantrae (Ayrshire), on *Fucus serratus*, but not in perfection on this plant, whose leaves are too narrow to permit its perfect growth: on the shore at Leith too I have gathered it; and on a specimen of *Nitophyllum Gmelini*, from Sidmouth, favoured me by Dr. Greville, it appears. Its distribution would thus seem to be extensive.

I lately ascertained that it had been found by Dr. Drummond, many, perhaps thirty, years ago, at Larne.

M. membranacea, Flem.

Flustra tuberculata, Johnst. B. Z., 289, pl. 34, f. 9. On shells and stones from Belfast and Strangford Loughs, W. T.

Often inside our largest dead univalve shells. On stones and Algæ. On *Pectunculus pilosus*, from Magilligan, Co. Londonderry.

Genus FLUSTRA.

F. foliacea, Linn.

Dublin, Down, Antrim, and Londonderry coasts. On the last produced very fine, some specimens broadening out towards the extremities, so as to present the outline of *Padina Pavonia*, some whole or entire, others divided; in Dublin Bay in same state. About Leith I have found it thrown up plentifully, and of a much larger size than it attains on the Down and Antrim coasts.

F. chartacea, Gmelin.

East and South of Ireland. First added by Prof. Allman.

F. truncata, Linn.

This species is local on the Irish coast. In Templeton's collection are specimens from Dublin Bay. It is common in Belfast Bay.

F. carbasea, Ellis and Soland.

North of Ireland. Mr. Templeton.

F. avicularis, Somerby.

Dredged at Kingstown (1837) and Dalkey Sound.
Dublin Bay, Dr. Ball and W. T. Belfast Bay, W. T.
Ballysodare Bay, Co. Sligo, Mrs. Hancock.

F. lineata, Linn.

On *Laminaria digitata* and on stones dredged in Strangford Lough, W. T. On same dredged in Killery Bay, Connemara, W. T. &c.

F. Murrayana, Bean.

In deep water, Dublin coast, Mr. M'Calla.

F. membranacea, Ellis.

This most common species was by some oversight omitted in Templeton's catalogue. It is abundant round the coast on the fronds of *Laminaria digitata*.

Genus CELLULARIA.

C. ciliata, Pallas.

This beautiful and graceful species is sparingly found on Algæ and Zoophytes (I have one specimen adherent to a stone) around the coast of Ireland. W. T.

C. scruposa, Pallas.

Noticed by Templeton as found on the Dublin coast, whence I had it in 1834 and subsequently. W. T.

C. reptans, Pallas.

Common around the coast of Ireland on various objects, especially Algæ; sometimes springing from the *Furcellaria fastigiata* and *Desmarestia aculeata*, &c., as well as from the stems and broad leaves of *Laminaria digitata*.

C. avicularia, Ellis.

Parasitic on *Alcyonidium gelatinosum*, *Flustra foliacea*, and Algæ,

dredged in Belfast Bay, Dr. Drummond and W. T., and timber taken up at Kingstown, Dr. Ball.

Genus ACAMARCHIS.

A. neritina, Lamx.

North of Ireland, Mr. Templeton. (Probably *Cellularia avicularia*, W. T.)

A. plumosa ?

Dredged in Strangford Lough, 1834. G. C. H. and W. T. (two specimens). Dredged at Bangor, 1838, Dr. Drummond (one specimen).

Genus ESCHARA.

E. foliacea, Lam.

Obtained by Mr. W. Todhunter, off Cape Clear, winter of 1848.

Genus RETEPORA.

R. Beaniana, King.

Cape Clear. Prof. Allman.

Genus FARCIMIA.

F. salicornia, Johnston.

Dredged in Belfast and Dublin Bays, W. T.

F. sinuosa, Hassall.

Dredged in Belfast and Dublin Bays, W. T.

Genus ALCYONIDIUM.

A. gelatinosum, Lamour.

Of occasional occurrence on the North-East coast, W. T.
Dredged at Bangor, Belfast Bay, in 1835 and subsequently, W. T. Youghal, Miss Ball.

A. hirsutum, Johnst.

Not uncommon on the northern shores, W. T.
Down and Antrim coasts, Dr. Drummond and W. T. I have sometimes found it in profusion investing various species of Algæ, particularly the *Floridea*, of which the *Delesseria alata* would seem to be the favourite: appears occasionally to have an independent existence, no portion of a plant being visible at the base; whether it may have absorbed the ladder by which it aspired to its full height, I do not know. Clifden, Connemara, W. T. Glendore, Co. Cork, Prof. Allman. Youghal, Miss Ball.

A.? parasiticum, Johnst.

Attached to *Sertulariæ*, &c., on the northern and eastern shores, W. T.
Dublin Bay, 1834, Prof. Harvey; common here, chiefly on *Plumularia falcata* and *Sertularia argentea*.

A. echinatum, Johnst.

Commonly incrusting univalve shells around the coast.
March, 1844.—Mr. James M'Adam, jun., who has just returned from

Balbriggan Bay, brought me specimens of *Fusus corneus*, *Turritella terebra*, and *Natica Alderi*, stating that out of thousands of univalve shells examined by him there, these three species only were coated with *A. echinatum*. W. T.

Genus CYCLOUM.

C. hispidum, Fabr.

Ballysodare Bay, Co. Sligo, Mrs. Hancock. Dublin Bay, Miss Ball. Sept., 1839. Belfast and Strangford Loughs, W. T.

Genus SARCOCHITUM.

S. polyoum, Hassall.

North and East of Ireland, Dr. Hassall.

July 15th, 1848.—I found what appears to be this species in a limpet between tide-marks at Cultra, and adherent to stones there also. Hassall makes a similar remark, Johnst. B. Zoop., 2nd ed. p. 367.

Genus CRISTATELLA.

C. mucedo, Cuv.

Fresh waters in East and South of Ireland.

Genus ALCYONELLA.

A. stagnorum, Lam.

Fresh waters, East of Ireland.

Genus PLUMATELLA.

P. repens, Lam., Johnst.

In rejectamenta on the shores of Lough Erne, I obtained this species in Sept., 1837.

P. emarginata, Allman.

East and South of Ireland, Prof. Allman.

P. fruticosa, Allman.

East and South of Ireland, Prof. Allman.

Genus FREDERICELLA.

F. Sultana, Allman.

Bandon, Dublin, Prof. Allman.

F. dilatata, Allman.

Fresh waters, Dublin, Prof. Allman.

Genus PALUDICELLA.

P. articulata, Gervais.

Grand Canal, Dublin, Prof. Allman. Lough Erne, 1837, W. T.

FORAMINIFERA.

Genus SPIRULINA.

S. Carinatula, Mont. (sp.). *Nautilus Carin.*, Mont.
In shell-sand from Bundoran, Co. Donegal, collected by Mrs. Hancock.

S. subarcuatula, Mont. (sp.).
Bundoran, Mr. Warren.

Genus TRILOCULINA.

T. Glabra, Brown's Illus., pl. 1, f. 20, 21.
In shell-sand collected at Portmarnock, and sent me by Mr. Warren.

T. rotundata, Brown's Illus., pl. 1, f. 14, 15.
Bundoran, Mrs. Hancock.

T. minuta, Brown, (sp.).?
Magilligan, 1833, W. T.

Genus RENOIDEA.

R. oblonga, Brown's Illus., pl. 1, f. 16, 17.
Bundoran, Mrs. Hancock.

Genus LENTICULINA.

L. calcar, Mont. (sp.).
Miltown Malbay (Co. Clare), in sand, Professor Harvey.

L. lævigatula, Mont.
With the last.

L. depressula, Mont. (sp.).
Portmarnock, Turton Cat. 5.

Genus NOIONINA.

N. umbilicatula, Mont. (sp.).
Portmarnock, Turton Cat. 5.

Genus ROTALIA.

R. beccarii, Mont. (sp.).

In sand from Portmarnock. Portmarnock, Turton Cat. 5. *East.* Portmarnock, Miss M. Ball.

R. beccarii-perversus, Mont. (sp.).

Portmarnock, Turton. Portmarnock, Miss M. Ball.

R. inflata, Mont. (sp.).

Portmarnock, Turton.

R. crassula, Mont. (sp.).

Brown Illust. Bundoran, Mrs. Hancock.

Genus LOBATULA.

L. vulgaris, Mont. (sp.).

Portmarnock, Turton. Portmarnock, Miss M. Ball. Miltown Malbay, Prof. Harvey. Bundoran, Mrs. Hancock.

Genus VERMICULUM.

V. intortum, Mont.

On a sponge from Strangford, Templeton's MS. Of general occurrence.

V. oblongum, Mont.

North of Ireland, Mr. Templeton. Portmarnock, Turton.

V. subrotundum, Mont.

Portmarnock, Turton.

Genus LAGENULA.

L. (Flem.) *striata*, Mont.

Among sand at the Whitehouse Point [Belfast Bay], October, 1810, Temp. MS.

L. globosa, Mont.

Among *Conferva pennata*, Belfast Bay, Temp. MS.

L. lævis, Walk.

Miltown Malbay, rare—in sand. Professor W. H. Harvey.

Genus NODOSARIA.

N. legumen, Linn.

Portmarnock, Turton.

N. recta, Maton and Rack. (sp.) Mont.

Bundoran, Mrs. Hancock.

Genus NAUTILUS.

N. pulchella, Temp. (R.)

Annals, N. H., April, 1840, p. 99. Bangor, Co. Down, Mr. Hyndman.

N. dentatus, Temp. (R.)

Annals, N. H., April, 1840, p. 99. Bangor, Co. Down, Mr. Hyndman.

Genus ROTALINA.

R. communis, D'orb.

Bundoran, Mrs. Hancock, 1840; Mr. Warren, 1844.

Genus MILIOLA.

M. ovata, Crouch.

Common on the North, East, and South coasts.

Genus QUINQUELOCULINA.

Q. semilunaris, D'orb.

Bundoran, Mr. Warren.

Var. Q. cora, D'orb.

Portmarnock, 1835, W. T.

Genus GLOBULINA.

G. gibba, D'orb.

Bundoran, Mrs. Hancock.

Genus ARETHUSA.

A. lactea, Mont. (sp.).

Roundstone, Co. Galway, Mr. Barlee, by whom I have been favoured with a specimen thence.

AMORPHOZOA.

Genus TETHEA.

T. lyncurium, Linn. (sp.).

Strangford Lough, both on dead and on living specimens of *Modiolus vulgaris*, and on dead univalve shells. They were all bright yellowish-orange in colour (hence Pallas' name *aurantium*) when recent, but became at once discoloured on being put in spirits. The largest *Tethea* is $1\frac{3}{4}$ inch high by $1\frac{1}{2}$ inch in diameter. The numerous spicula were in some individuals confined to the apices of the tubercles, and in others projected from all parts of them, so as to give to the entire surface of the animal when alive a conspicuously hispid appearance. One or two specimens of what seem to be young *Tetheæ* (half an inch diameter) on the same shell with the old, are quite smooth on the surface.

Genus HALICHONDRIA.

H. oculata, Pall.

Found on the shore of Belfast Lough, Mr. Templeton.

Belfast Bay, Sept. 1837, Messrs. Getty and Hyndman. Dublin Bay, Dr. Hassall.

H. cervicornis, Pall.

Belfast Bay, Mr. Templeton, Mr. Hyndman. Dublin, Professor Harvey. Waterford, Miss Ball.

Birterbuy Bay, dredged by Dr. Farran. Since which, Mr. M'Calla obtained it of large size and in abundance, adhering to shells, in eighteen fathoms water.

H. hispida, Mont.

This species was only I believe known from Montagu's description of specimens obtained in Devonshire until Dr. Scouler, in a contribution to Annals N. H. (vol. xvii. p. 176), noticed it as having been dredged from deep water at Roundstone by Mr. M'Calla, collector of objects of natural history. A few specimens were taken under the circumstances already mentioned in June last at Strangford Lough: the largest is attached to a valve of *Cytherea ovata*, over which its base spreads, and thence it branches out on either side. Montagu's figure of the species is characteristic, and his description admirable as usual, and so full as to require no addition. *Halichondria mammillaris*, *Dysidea fragilis*, *D.? papillosa* (as already noticed), *Aliona chelata*, &c., were obtained on the same occasion.

H. ventilabra, Flem.

Specimens of this sponge (with one of which I have been favoured) were obtained by Dr. Ball from the Nymph Bank, in 1818.

H. simulans, Johnst.

Dublin Bay, Dr. Hassall. Connemara, Mr. M'Calla.

H. cinerea, Grant.

East and West of Ireland, Clew Bay, W. T.

H. fucorum, (W. T.) See Johnst. Br. Sp., p. 112 and 113.

In Belfast Bay I generally find this species, as it is represented in pl. ix. of Brit. Sponges, on *Halidrys siliquosa*. When exposed for a time on the beach, it assumes a brilliant orange colour. Killery Bay, 1840, W. T. Common on Algæ and Zoophytes (littoral and deep-water), Down and Antrim. Not uncommon on marine plants and the large corallines on the North-East coast, W. T.

H. panicea, Pall.

In addition to bringing Templeton's sp. *urens* and *cristata* under this, Johnston also brings his *Alcyonium tomentosum* and *medullare* (var. *S. tomentosa*, common on Algæ and Zoophytes, Down and Antrim). This species invests *Inachus scorpio*, in the North. Burren, Co. Clare, W. T.

Spongia palmata, Templeton. A var. *H. panicea*, Johnst. Br. Sp., p. 94.

This species is most common, investing to a great extent the stems of *Laminaria digitata*, on the coasts of Down, Antrim, and Dublin.

H. ægagropila, Scouler.

On ovum of common dog-fish, brought with Derry oysters to Belfast, W. T. Connemara, Mr. M'Calla.

H. incrustans, Esper. (sp.).

Abundant, adherent to rocks between tide-marks on the Down coast. Dr. Johnston calls it an "unattractive species," in which—but it is a matter of mere taste—I cannot agree. Its reddish orange colour on the dark rocks is to my eye most lively and pleasing, and more particularly so when other sponges are in its immediate proximity. At Ballyholme, Belfast Bay, within the space of a very few square feet, this species may be seen in small orange patches on the rock; *Hal. panicea* in green masses, and by throwing aside the hanging fronds of *Fucus nodosus* (covered by their parasite *Polysiphonia fastigiata*), *Ptilota plumosa* densely clothing the shaded rock is exposed to view, and on it the *Grantia botryoides* and *G. foliacea* grow plentifully, and the *G. ciliata* is sparingly seen.

Although *H. incrustans* inclines generally to look directly down upon the water, or to grow on the under surface of rocks (see Grant, quoted in Johnst. B. S., p. 124), I find it also attached to their perpendicular sides, and when so, the "fecal orifices" are elevated, but not very much, above the surface.

I saw no other sponge attached to the rocks here.—Springvale, Down, July 16th, 1846.

H. saburrata, Johnst.

West of Ireland, Mr. M'Calla.

H. areolata, Johnst.

Belfast Bay, August, 1840, Messrs. Getty and Hyndman. Dublin, Dr. Hassall. Killery and Roundstone, W. T.

H. seriata, Grant.

Ireland's Eye, W. T. Tory Island, August, 1845, Mr. Hyndman. Investing stems of *Laminaria digitata*, at Springvale, Down, February, 1846, and of a deep red colour when fresh, W. T.

H. sanguinea, Grant.

Springvale, Co. Down, W. T. Covering *Pecten*, in Clew Bay.

H. macularis. (See Dr. Johnston, in Berw. Club Proc., vol. ii. p. 196.)

This sponge incrusts the inside of an old valve of *Pecten opercularis* dredged in Strangford Lough.

When dredging in Strangford Lough on the 22nd of June, 1846, with Mr. Hyndman, we were singularly fortunate in the number of sponges obtained; there were as many species as all our former dredgings combined produced:—the depth was from fifteen to twenty fathoms, the bottom soft and rather oozy. Among them was this new species.

H. hirsuta, Flem.

Strangford Lough, W. T.

H. suberia, Mont.

This species, as represented by Dr. Coldstream, has occurred to me investing univalve shells dredged in the Loughs of Strangford and Belfast. In the former locality I, in 1835, obtained the *Spongia? suberia*, which in the Magazine of Natural History, vol. vii. p. 491, is described and figured by Dr. Johnston, who considered it the "perfect state of the *H. suberica*."

Sept. 27th, 1847.—Dredged from 20 fathoms, entrance Belfast Bay. When recent, this species is often on the upper side (*i. e.* upper as to the motions of the *Pagurus* inhabiting the *Turritella terebra*, on which the sponge is based) bright orange, much paler on the under side, or that from the light. The shell on which this sponge grows is almost invariably tenanted by a *Pagurus* of some species: species various, W. T. Carlingford, Mr. Hyndman.

H. mammillaris, Müll.

A specimen of this sponge, which I have not seen referred to as identical with any British species, was dredged in Strangford Lough, in 1835, by Mr. Hyndman and myself.

H. carnosa, Johnst.

The only locality for this species given in Dr. Johnston's work is Roundstone Bay, Connemara. The author omitted noticing the species as from Strangford Lough, where I dredged it in July, 1838, and sent it

to him with many other sponges, on being informed of his contemplated work upon the subject: in the same year this species was procured in Belfast Bay by Dr. Drummond. In July, 1840, it was dredged by our party at Killery Bay, Connemara; two specimens thence in my collection, as well as the first alluded to, are attached to *Turritella terebra*. Several procured in Strangford Lough are attached to *Cytherea ovata*—the largest is 2½ inches in height, and quite pyriform.

In 1843 Mr. Hyndman dredged it in Carlingford Bay, attached to *Turritella terebra*.

Genus CLIONA.

C. celata, Grant.

In perforations of the shell of the oyster (*Ostrea edulis*) taken in Belfast Bay and elsewhere on the North-East coast, W. T.

January, 1848.—In Belfast market to-day I observed a very fine Carrickfergus oyster, 6 inches in diameter, covered with this species, both in a mass outside its shell, and filling up the drilled apertures through the layers of the shell. It thus at once presented var. A and var. B of Johnston on Sponges, p. 125. I found that shells so invested are called in the market "rotten oysters," and to prove the correctness of this term, a vender of the oysters showed me how the shell broke between his fingers. He remarked that the oyster itself was nevertheless quite good, as the inner portion of the shell next it always remained sound. (This is quite in accordance with Dr. Grant's observations.) Among oysters from Strangford Lough "rotten ones" also are found.

March 1st, 1848.—I found *Cliona* filling the perforations in two immense Carrickfergus oysters (2 lbs. and 1¾ lb weight); it rises above the surface of the shell outside, in little eminences. One shell that it appears through (except on inner surface, which is entire, a yellowish-brown marking, however, there denoting the presence of the *Cliona*) is 1½ inch in thickness.

Genus SPONGILLA.

S. fluviatilis, Pall.

North of Ireland, Mr. Templeton. River Inver, Larne. Branched form, shores Lough Erne, 1837, W. T.

March 24th, 1837.—I received from James Grimshaw, jun., Esq., specimens of a *Spongilla* "which grew about pipes in one of the ponds at Whitehouse." They assume very different forms, several being flattish, and which probably had spread over the pipes, and one large mass a foot long, and half as much broad, is much branched; but this is chiefly an incrustation on what appears like the remains of an old heather besom, but when there is nothing woody for a foundation it branches out considerably. This latter form seems identical with the *Ephydatia canalium*, as figured by Fleming (Phil. of Zool., t. v. f. 4). This figure is stated to have been taken "from an Irish specimen" (vol. ii. p. 614), but when procured, or by whom obtained, is not mentioned. Of the two British species of *Spongilla*, this agrees with *S. fluviatilis* (*Halicondria fluv.*, Flem. Brit. An., p. 524), the *S. lacustris* being of a "hard" nature.

S. lacustris, Flem.,

Was noticed by Dr. Allman before Dublin Nat. Hist. Society, in 1848, as found by him in the lower lake of Killarney, and in some of the County Wicklow lakes.

Genus SPONGIA.

S. pulchella, Sow.

Carrickfergus, Mr. Templeton.

S. limbata, Mont.

Specimens from Bangor, 1835, Dalkey Sound, 1836, Dr. Ball, Springvale, Down, have been so named by Dr. Johnston. Strangford, W. T. Grows about roots of tangle, as well as stones, &c.

Genus GRANTIA.

G. compressa, Fabr.

On the stems of various species of Algæ, *Corallina officinalis*, and Zoophytes, on Antrim and Down coasts, and generally distributed.

G. lacunosa, Bean.

Strangford Lough, near Portaferry, July, 1838, W. T.

Dredged from a depth of 8 to 10 fathoms at Donaghadee, May, 1843, Dr. Drummond.

G. ciliata, Fabr.

This very beautiful species I have commonly found on marine plants on the North-East coast, and occasionally of large size. Specimens attached to a small *Mytilus* from Belfast Bay, December, 1844. On various Algæ and Zoophytes, Down and Antrim coasts, Killery Bay, 1840, W. T. Two small specimens ($\frac{1}{4}$ inch in height) of this sponge were found attached to the carapace of a living spider crab (*Stenorhyncus phalangium*) dredged in Belfast Bay. This species is generally distributed on the Irish coasts.

G. botryoides, Ellis and Solander.

On various Algæ and Zoophytes on Down and Antrim coasts; Strangford Lough, W. T. See remark on this, *G. compressa*, and *G. ciliata*, under *Hal. incrustans*: but they are found in rather deep water, as well as between tide-marks. Killery Bay, 1840, W. T.

G. fistulosa, Johnst.

Portaferry, W. T.

G. nivea, Grant.

West of Ireland, Mr. M'Calla.

G. coriacea, Mont.,

Was found on an *Anomia* attached to an oyster dredged at Killough, Downshire, March, 1835, W. T.

Genus DYSIDEA.

D. fragilis, Mont.,

Belfast Bay, Mr. Templeton. On tangle-root, Bangor, 1835, W. T. Dredged in Belfast Bay, August, 1840, Mr. Hyndman. Strangford Lough, from 20 fathoms, June, 1846, G. C. H. and W. T.

APPENDIX.

I. SYNONYMS OF MOLLUSCA.

In consequence of the great change that has taken place in the nomenclature of this class, the names used by Mr. Thompson are, in many cases, different from those of Forbes and Hanley, the latest authorities on the subject. It has therefore been considered desirable to enumerate all such species, giving in one column the name employed by Mr. Thompson, and opposite to it in another column, the corresponding term of Forbes and Hanley.

CEPHALOPODA.

Thompson.	Forbes and Hanley.
Sepia rupellaria	Sepia bisserialis
Loligo sagittata	Ommastrephes sagittatus
L. subulata	Loligo media
L. Eblanæ	Ommastrephes Eblanæ
Eledone octopodia	Elodone cirrhosus
Rossia Jacobii	Rossia macrosoma
Spirula Australis	Spirula Peronii
Peracle Flemingii	Spirialis Flemingii

NUDIBRANCHIATA.

Doris obvelata	Doris Johnstoni
Polycera typica	Polycera quadrilineata
P. citrina	P. Lessonii
P. cristata	Ancula cristata
Euplocamus claviger	Triopa claviger
Tritonia lactea	Dendronotus arborescens
Calliopæa bifida	Hermæa bifida
Eolis pallida	Eolis picta
E. violacea	E. tricolor
Alderia amphibia	Alderia modesta.

TECTIBRANCHIATA.

Bulla lignaria	Scaphander lignarius
B. Akera	Akera bullata
B. cylindracea	Cylichna cylindracea

Thompson.	Forbes and Hanley.
B. truncata	Cylichna truncata
B. obtusa	C. obtusa
B. mammillata	C. mammillata
B. hyalina	Amphisphyra hyalina
B. pectinata	Philine scabra
Bullæa aperta	P. aperta
B. pruinosa	P. pruinosa
	PULMONIFERA.
Arion ater	Arion empiricorum
Limax maximus	Limax cinereus
L. arboreus	L. arborum
L. carinatus	L. Sowerbyi
Helix alliaria	Zonites alliarius
H. cellaria	Z. cellarius
H. pura	Z. purus
H. radiatula	Z. radiatulus
H. lucida	Z. nitidus
H. excavata	Z. excavatus
Bulimus lubricus	Zua lubrica
Pupa marginata	Pupa muscorum
Vertigo edentula	P. edentula
V. pygmæa	P. pygmæa
V. substriata	P. substriata
V. palustris	P. antivertigo
V. pusilla	P. pusilla
V. angustior	P. Venetzii
Balæa perversa	B. fragilis
Ancylus lacustris	Ancylus oblongus
Planorbis imbricatus	Planorbis nautilus
P. umbilicatus	P. marginatus
	PECTINIBRANCHIATA.
Chemnitzia Jeffreysii	Chemnitzia scalaris
C. unica	Aclis unica
C. nitidissima	A. nitidissima
Turritella terebra	Turritella communis
Brochus striatus	Cæcum Trachea
B. lævis	C. glabrum
Paludina tentaculata	Bithinia tentaculata
Lacuna quadrifasciata	Lacuna vincta
Rissoa Harveyi	Odostomia excavata
R. semicostata	Rissoa striata
R. interrupta	R. parva
R. unifasciata	R. rubra
R. Balliæ	Chemnitzia indistincta
R. tristriata	R. semistriata
R. Warreni	Odostomia Warreni
R. albella	Jeffreysia diaphana
Odostomia crassa	Odostomia bulimoides
Skenea depressa	Skenea planorbis
S. serpuloides	S. divisa

Thompson.	Forbes and Hanley.
Trochus littoralis	Trochus cinerarius
T. papillosus	T. granulatus
Monodonta crassa	T. lineatus
Ianthina nitens	Ianthina pallida
Scalaria clathrus	Scalaria communis
Triphoris adversus	Cerithium adversum
Nassa macula	Nassa incrassata
N. varicosa	N. pygmæa
Buccinum ovum	Buccinum Dalei
Fusus corneus	Fusus Islandicus
F. muricatus	F. muricatus
F. Barvicensis	Trophon Barvicensis
F. Bamfius	T. clathratus
Pleurotoma Boothii	Mangelia Leufroyi
P. turricula	M. turricula
P. costata	M. costata
P. septangularis	M. septangularis
P. attenuata	M. attenuata
P. nebula	M. nebula
P. linearis	M. linearis
P. purpurea	M. purpurea
P. gracilis	M. gracilis
P. Trevellyana	M. Trevellyana
P. Farrani	M. striolata
P. brachystoma	M. brachystoma
P. Ulideana	M. rufa
P. lævigata	M. nebula
P. teres	M. teres
Triton erinaceus	Murex erinaceus
Erato lævis	Marginella lævis
Sigaretus perspicuus	Lamellaria perspicua
S. tentaculatus	L. tentaculata
Capulus Ungaricus	Pileopsis Hungaricus
Fissurella Græca	Fissurella reticulata
Emarginula fissura	Emarginula reticulata
Lottia virginea	Acmæa virginea
L. testudinalis	A. testudinalis
L. fulva	Pilidium fulvum

CYCLOBRANCHIATA.

Patella ancyloides	Propilidium ancyloide
Chiton marginatus	Chiton cinereus
C. fuscatus	C. cinereus
C. lævigatus	C. marmoreus

BRACHIOPODA.

Terebratula aurita	Terebratula Caput—Serpentis
T. psittacea	Hypothyris psittacea
Crania personata	Crania anomala

LAMELLIBRANCHIATA.

Thompson.	Forbes and Hanley.
Anomia squamula	Anomia ephippium
A. undulata	A. patelliformis
A. punctata	A. ephippium
A. cylindrica	A. ephippium
Pecten sinuosus	Pecten Pusio
P. glaber	P. Danicus
P. lævis	P. tigrinus
P. obsoletus	P. tigrinus
Lima tenera	Lima hians
Avicula Atlantica	Avicula Tarentina
Arca fusca	Arca tetragona
Nucula margaritacea	Nucula radiata
N. minuta	Leda caudata
N. Polii	Nucula decussata
Modiola vulgaris	Mytilus modiolus
M. Gibbsii	Modiola barbata
M. discrepans	Crenella discors
M. marmorata	C. marmorata
M. vestita	Modiola Ballii
Pinna ingens	Pinna pectinata
Alasmodon margaritiferus	Unio margaritiferus
Cardium ciliare	Cardium aculeatum
C. fasciatum	C. elongatum
C. exiguum	C. pygmæum
C. Loveni	C. suecicum
Donax complanatus	Donax politus
Tellina squalida	Tellina incarnata
Lucina radula	Lucina borealis
L. rotundata	Diplodonta rotundata
Amphidesma prismatica	Syndosmya prismatica
A. Boysii	S. alba
A. tenuis	S. tenuis
A. intermedia	S. intermedia
Cyprina minima	Circe minima
Montacuta purpurea	Turtonia minuta
Astarte Danmoniensis	Astarte sulcata
A. Scotica	A. sulcata
Cytherea ovata	Venus ovata
Venus Pennantii	V. striatula
V. sinuosa	Lucinopsis undata
Pullastra aurea	Tapes aurea
P. vulgaris	T. pullastra
P. decussata	T. decussata
P. virginea	T. virginea
Petricola ochroleuca	Diodonta fragilis
Corbula striata	Corbula nucleus
Anatina prætenuis	Cochlodesma prætenue
Lutraria vulgaris	Lutraria elliptica
L. hians	L. oblonga
L. compressa	Scrobicularia piperata

Thompson.	Forbes and Hanley.
Solen vagina	Solen marginatus
S. legumen	Ceratisolen legumen
S. antiquatus	Solecurtus coarctatus
S. strigilatus	S. candidus
Pholas papyracea	Pholadidea papyracea
Teredo bipalmulata	Teredo palmulata

TUNICATA.

Ascidia rustica	Cynthia rustica
A. tubulosa	Molgula tubulosa
A. grossularia	Cynthia grossularia
Phallusia intestinalis	Ascidia intestinalis
Botryllus Leachii	Botrylloides Leachii

II. ADDITIONS TO THE FAUNA OF IRELAND.

THE following additions to the Fauna of Ireland have been announced since Mr. Thompson's death (Feb. 1852). We have not sought, as he would have done, to investigate the nature of the claim put forward on behalf of any species to be enrolled in the Irish Fauna, but give them on the responsibility of the several gentlemen whose names are appended.

MAMMALIA.

Vespertilio mystacinus.

County Clare, Dr. Kinahan, Dublin Natural History Review, vol. i. p. 248.

BIRDS.

Malacorynchus membranaceus.

Castlemaine Bay, Co. Kerry, Wm. Andrews, Esq. Dublin N. H. Rev., vol. i. p. 25, 76.*

Puffinus obscurus.

Valentia, Co. Kerry, Watter's Birds of Ireland.

FISHES.

Balistes capriscus.

Galway Bay, Prof. Melville. See Dr. Carte, Dublin N. H. Rev., vol. i. p. 161.

Polyprion cernium.

Dingle Bay, W. Andrews, Esq., Dublin N. H. Rev., vol. ii. p. 38.

Lepidopus argyreus.

Dublin Bay, Dr. Ball, Dublin N. H. Rev., vol. ii. p. 45.

MOLLUSCA.

Rissoa fulgida.

Arran, Ireland. Cork Harbour. Bantry Bay. Forbes and Hanley.

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* Dr. Ball thinks that this bird could not have occurred in Kerry, except as one escaped from confinement.—ED.

Rissoa soluta.
Cork Harbour, Jeffreys. Forbes and Hanley.

Nucula radiata.
Lundy Island, M'Andrew. Forbes and Hanley.

Thracia villosiuscula.
Cork Harbour, Wright and Carroll, Annals Nat. Hist., vol. ix. p. 157.

Chemnitzia rufescens.
Cork Harbour, Wright and Carroll, Ann. N. Hist., vol. ix. p. 157.

Cylichna nitidula.
Cork Harbour, Wright and Carroll, Ann. N. Hist., vol. ix. p. 157.

Cylichna strigilla.
Cork Harbour, Wright and Carroll, Ann. N. Hist., vol. ix. p. 157.

Teredo megotara.
Killery Bay, W. W. Walpole, Esq., Ann. N. Hist., vol. x. p. 77.

Cytherea chione.
Dalkey Sound, W. W. Walpole, Esq., Ann. N. Hist., vol. x. p. 77.

Anomia striata.
Dalkey Sound, W. W. Walpole, Esq., Ann. N. Hist., vol. x. p. 77.

Corbula rosea.
Off Dublin Bay, W. W. Walpole, Esq., Ann. N. Hist., vol. xii. p. 366.

Astarte elliptica.
Dalkey Sound, W. W. Walpole, Esq., Ann. N. Hist., vol. xii. p. 366.

Ianthina pallida.
Kilkee, W. Hopkins, Esq., Dublin N. H. Rev., vol. ii. p. 97.

Succinea oblonga.
Finnoe, Ed. Waller, Esq., Dublin N. H. Rev., vol. iii. p. 19.

Teredo malleolus.
W. W. Walpole, Esq., near Roundstone.*

Psammobia costulata.
W. W. Walpole, Esq., Birterbuy Bay.*

Rissoa Zetlandica.
W. W. Walpole, Esq., Birterbuy Bay.*

Amphisphyra hyalina.
W. W. Walpole, Esq., Birterbuy Bay.*

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* While this sheet was passing through the press, we were favoured with a note from W. W. Walpole, Esq., giving the names of these four additional species of unrecorded Irish Mollusca.—Ed.

ANNELIDA.

Nereis tubicola.

Co. Galway, W. Andrews, Esq., Dublin N. H. Rev., vol. ii. p. 35.

ZOOPHYTES.

Campanularia parvula.

* North of Ireland, Rev. Thomas Hincks, Ann. N. Hist., vol. xi. p. 178.

Campanularia caliculata.

County Cork, Rev. Thomas Hincks, Ann. N. Hist., vol. xi. p. 178.

III. LIST OF MR. THOMPSON'S PUBLICATIONS.

1. NOTE on *Sterna arctica*, *Hirundo Dougalii* and *cantiaca*, and *Larus capistratus* as Irish.—Proc. Zool. Soc. Lond. 1833, I. p. 33; XIII. p. 11.
2. On an immature specimen of the Long-tailed Manis (*Manis tetradactyla*, Linn.) from Sierra Leone.—Proc. Zool. Soc. II. p. 28.
3. Notice of the Cuckoo (*Cuculus canorus*, Linn.).—Proc. Zool. Soc. Lond. II. p. 29.
4. Catalogue of Birds new to the Irish Fauna.—Proc. Zool. Soc. Lond. II. p. 29.
5. On some Additions to the British Fauna.—Proc. Zool. Soc. III. p. 77.
6. On some Vertebrata new to the Irish Fauna.—Proc. Zool. Soc. III. p. 78.
7. On some rare Irish Birds.—Proc. Zool. Soc. III. p. 82.
8. On the Herring Gull of the North of Ireland.—Proc. Zool. Soc. III. p. 83.
9. On the Natural History of Ireland, with a description of a new genus of Fishes (*Echiodon*).—Proc. Zool. Soc. V. p. 52.
10. On Vertebratæ new to Science—to Britain, to Ireland, &c.—Proc. Zool. Soc. Lond. 1837, p. 51.
11. On a new subgenus of Fishes allied to *Ophidium*.—Tr. Zool. Soc. Lond. II. p. 207, fig.
12. Observations on some species of native Mammalia, Birds and Fishes, including additions to the British Fauna. List of Land and Freshwater Mollusca new to Ireland.—Lond. and Edinb. Phil. Mag. 1834, V. p. 298.
13. On some remarkable Crystals of Snow.—Lond. and Edinb. Phil. Mag. 1834, V. p. 318.
14. On the *Teredo navalis* and *Limnoria terebrans*, as at present existing in certain localities on the coasts of the British Islands.—Edinb. New Phil. Journ. XVIII. p. 121.
15. On *Larus Sabini*.—*Jard.* and *Selby's* Ill. of Orn. new ser. No. 6, 1839.
16. On the Irish Hare (*Lepus Hibernicus*). Dubl. 1838, 4to.—Tr. Roy. Irish Acad. XVIII. 2.—Proc. R. I. Acad. 1838, p. 177.—Ann. of Nat. Hist. II. p. 70.
17. Report on the Fauna of Ireland (*Vertebrata*).—Rep. Brit. Assoc. 1840, p. 353.
18. Report on the Fauna of Ireland. Div. *Invertebrata*.—Rep. Brit. Assoc. 1843, p. 245.
19. Supplementary Report on the Fauna of Ireland.—Rep. Brit. Assoc. 1852, p. 290.
20. On Irish *Algæ*.—Mag. Nat. Hist. IX. p. 147.
21. On the Natural History of a portion of the South-west of Scotland.—Mag. Nat. Hist. ser. 2, II. p. 18.

22. On the Red Band-Fish, *Cepola rubescens*, Linn.—Mag. Nat. Hist. ser. 2, II. p. 214.
23. On the Identity of *Hunter's Delphinus bidentatus*, *Baussard's Hyperoodon honfleuriensis*, and *Dale's* Bottle-head Whale.—Mag. Nat. Hist. ser. 2, II. p. 221.
24. Zoological Notes on a few species (of Mammalia) obtained from the South-west of Scotland.—Mag. Nat. Hist. ser. 2, III. p. 585.
25. On a new genus of Fishes from India.—Mag. Nat. Hist. ser. 2, IV. p. 184.
26. On the Pollan (*Coregonus pollan*, Thomps.) of Lough Neagh.—Mag. Zool. and Bot. I. p. 247.
27. On Hybrids produced in a wild state between the Black Grouse (*Tetrao tetrix*) and Common Pheasant (*Phasianus colchicus*).—Mag. Zool. and Bot. I. p. 450.
28. Contributions to the Natural History of Ireland.—Mag. Zool. and Bot. I. p. 459; II. pp. 42, 170, 427.—Ann. of Nat. Hist. I. pp. 12, 181.
29. Contributions towards a knowledge of the *Crenilabri* (Cuv.) of Ireland, including descriptions of species apparently new to science.—Mag. Zool. and Bot. I. p. 450.
30. On the Snowy Owl (*Surnia nyctea*, Dum.).—Ann. of Nat. Hist. I. p. 241.
31. On Fishes new to Ireland.—Ann. of Nat. Hist. I. p. 348; II. pp. 14, 270.
32. On Fishes; containing a Notice of one Species new to the British and of others to the Irish Fauna.—Ann. of Nat. Hist. II. p. 266.
33. On the Breeding of the Woodcock (*Scolopax rusticola*, Linn.) in Ireland.—Ann. of Nat. Hist. II. p. 337.
34. Observations on several British Fishes, including the description of a new species.—Ann. of Nat. Hist. II. p. 402, fig.
35. On an apparently undescribed species of *Lepidogaster*, and on the *Gobius minutus*, Müll., and *Cyclopterus minutus*, Pall.? considered as the young of *C. lumpus*, Linn.—Belf. Nat. H. Soc. Dec. 1838.—Ann. of Nat. Hist. III. p. 34.
36. Note on the Migration of the Snowy Owl (*Surnia nyctea*, Dum.).—Ann. of Nat. Hist. III. p. 107.
37. Note on the Effects of the Hurricane of Jan. 7, 1839, in Ireland, on some Birds, Fishes, &c.—Ann. of Nat. Hist. III. p. 182.
38. Notes on Irish Birds.—Ann. of Nat. Hist. IV. p. 284; V. p. 364.
39. Note on the Occurrence at various times of the Bottle-nosed Whale (*Hyperoodon butzkopf*, Lacép.) on the coast of Ireland, and on its nearly simultaneous Appearance on different parts of the British Coast in the autumn of 1839.—Ann. of Nat. Hist. IV. p. 375.
40. Description of *Limneus involutus*, Harv.; with an Account of the Anatomy of the Animal, by *J. Goodsir*.—Ann. of Nat. Hist. V. p. 22.
41. On a minute *Alga* which colours Ballydrain Lake.—Ann. of Nat. Hist. V. p. 75.
42. Contributions towards a Knowledge of the *Mollusca nudibranchia* and *Mollusca tunicata* of Ireland, with descriptions of some apparently new species of *Invertebrata*.—Ann. of Nat. Hist. V. p. 84, fig.
43. Note on *Argulus foliaceus*, Jur.—Ann. of Nat. Hist. V. p. 221.
44. On a *Torpedo* taken on the Irish Coast.—Ann. of Nat. Hist. V. p. 292.
45. Catalogue of the Land and Freshwater *Mollusca* of Ireland.—Ann. and Mag. N. Hist. VI. pp. 16, 109, 194.
46. On Eels killed by the late Frost, Feb. 1841.—Ann. of Nat. Hist. VI. p. 75.
47. Notes on British Char (*Salmo umbla*, Linn.).—Ann. and Mag. N. Hist. VI. p. 439.
48. On the species of Stickleback (*Gasterosteus*, Linn.) found in Ireland.—Ann. and Mag. N. Hist. VII. p. 95.
49. Additions to the Fauna of Ireland, *Vertebrata* and *Invertebrata*.—Ann. of Nat. Hist. V. pp. 6, 245.—Ann. and Mag. Nat. Hist. VII. p. 477; XIII. p. 430; XV. p. 308; XVI. p. 357; XVIII. pp. 310, 383; XX. pp. 169, 237; Ser. 2, I. p. 62; VII. p. 477.—Proc. Zool. Soc. Lond. 1845.

50. Notice of migratory Birds which alighted on or were seen from H. M. S. Beacon, *Capt. Graves*, on the passage from Malta to the Morea at the end of April, 1841.—Ann. and Mag. N. Hist. VIII. p. 125.
51. *Cyclostoma elegans*, Lam., an Irish Shell.—Ann. and Mag. N. Hist. VIII. p. 228.
52. The Birds of Ireland (continued).—Ann. and Mag. N. Hist. VIII. pp. 273, 353, 406, 486; IX. pp. 141, 221, 373; X. pp. 50, 171; XI. p. 283; XII. pp. 31, 254.
53. Note on *Puffinus major*, Fab. (Greater Shearwater).—Ann. and Mag. N. Hist. IX. p. 433.
54. Note on Clouds of *Diptera*.—Ann. of Nat. Hist. X. p. 8.
55. Results of deep dredging off the Mull of Galloway, by *Capt. Beechey, R.N.*, drawn up by *W. Thompson, Esq.*—Rep. Brit. Assoc. 1842, Sect. p. 72.—Ann. and Mag. N. Hist. X. p. 21.
56. The *Crustacea* of Ireland. Order *Decapoda*.—Ann. and Mag. N. Hist. X. p. 274; XI. p. 102.
57. Note of *Pagurus Prideauxii*.—Ann. and Mag. N. Hist. XI. p. 238.
58. Note on *Griffithsia simplicifilum*.—Ann. of Nat. Hist. XII. p. 296.
59. Notice of the Blind Fish, Cray Fish, and Insects from the Mammoth Cave, Kentucky.—Ann. and Mag. N. Hist. XIII. p. 111.
60. Vessel pierced by Weapon of Sword-Fish.—Ann. of Nat. Hist. XIII. p. 235.
61. On Ova believed to be those of the large Spotted Dog-fish, *Scyllium catulus*, Linn.—Ann. and Mag. N. Hist. XIV. p. 23, fig.
62. Reference to Fossil Infusoria of Down.—Ann. of Nat. Hist. XVI. p. 213.
63. Note on the *Alcedo alcyon*, Linn., obtained in Ireland.—Ann. and Mag. N. Hist. XVI. p. 430; XVII. p. 69.
64. Notice of an American Bittern, *Botaurus lentiginosus*, Mont., obtained in Ireland.—Ann. and Mag. N. Hist. XVII. p. 91.
65. Notice of a Bottle-nosed Whale, *Hyperoodon butzkopf*, Lacép., obtained in Belfast Bay, Oct. 1845.—Ann. and Mag. N. Hist. XVII. p. 150.
66. Notice of a Surf Scoter, *Oidemia perspicillata*, Linn. (sp.), obtained on the coast of Ireland.—Ann. and Mag. N. Hist. XVIII. p. 368.
67. Periods of Flowering of Plants in the Spring of 1846.—Ann. of Nat. Hist. XIX. p. 223.
68. On the *Teredo norvegica*, &c.—Rep. Brit. Assoc. 1847.—Ann. and Mag. N. Hist. XX. p. 157.
69. On the Occurrence of the *Larus Bonapartii*, Rich. and Sw., for the first time in Europe.—Ann. and Mag. N. Hist. ser. 2, I. p. 192.
70. Note on Golden, Sea, and Bald Eagles.—Mag. Nat. Hist. ser. 2, II. p. 164.
71. Coloration of Water of Serpentine, London.—Botanical Gazette, Nov. 1850.
72. Memoir on the Metamorphosis and Natural History of the *Pinnotheres*, or Pea Crabs.—Entom. Mag. p. 85.
73. The Natural History of Ireland: Birds. Lond. 1849-51, 3 vols. 8vo.

THOMPSON (William) and PATTERSON (Robert).

1. On some Snow Crystals observed on the 14th of January, 1838.—Mag. Nat. Hist. ser. 2, III. p. 107.

Note.—The preceding list is a copy of that which appeared in the "Bibliographia Zoologiæ et Geologiæ." Ray Society, London, 1854. In it the several papers which were in continuation of the same subject have very judiciously been placed together. In Mr. Thompson's original list—a copy of which was sent to the Editors of the "Bibliographia"—each paper was recorded according to the date of publication.—ED.

IV. LIST OF SPECIES NAMED AFTER THE LATE WM. THOMPSON, ESQ.

Acipenser Thompsoni, Ball, Proc. R. I. Academy, n. 25, p. 21.

Bulimus Thompsoni,* Pfeiffer, Proc. Zool. Society.

Lepeoptheirus Thompsoni, Baird, Hist. Brit. Entomostraca, p. 278.

Thaumantias Thompsoni, Forbes, Annals Nat. Hist. vol. vii. p. 84.

Meloseira Thompsoni, Harvey, Manual Brit. Algæ, p. 195, 1st edit. This is the *Lyngbya Thompsoni* of Hassall.

Spirillum Thompsoni, Hassall, Brit. Fresh-water Algæ, p. 278, 1st edit. This is the *Anabaina spiralis* of W. T.

Dolichospermum Thompsoni, Ralfs, Annals Nat. Hist. vol. v. p. 336. This is Harvey's *Anabaina flos-aquæ*.

Pterinea Thompsoni, Portlock, Geol. Survey of Londonderry, p. 431.

Hippolyte Thompsoni, Bell, Hist. Brit. Crustacea, p. 290.

Pagurus Thompsoni, Bell, — — p. 373.

There may possibly be other species, named in like manner, but of which we are not at present informed.—Ed.

V. FISHES OF LOUGH NEAGH AND LAKE GENEVA.†

In the department of fishes, a comparison between the two lakes is very interesting, not only as illustrative of geographical distribution, but of the comparative value of their finny inhabitants. The number of species found in each lake may be set down as the same, or twenty-one in each. Of this number eight are common to both localities, namely,

Perca fluviatilis.
Gobio —
Leuciscus Erythrophthalmus.
Cobitis barbatula.

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* With respect to this species, we find the following memorandum in Mr. Thompson's hand-writing: "This is a South American species, brought home by Gordon A. Thompson, Esq., to Belfast Museum, and which I placed in the hands of M. Pfeiffer, jun., for description. Hence it was named after me; but as I was not particularized, I wished it to be understood as called after the gentleman named; and wrote to the describer to that effect."

† [It seems to have been Mr. Thompson's intention to have investigated the Natural History of Lough Neagh and the Lake of Geneva, both positively and comparatively; but that part of his MSS. which treats of the fishes, is the only portion which has been left in a state sufficiently far advanced to warrant publication.—Ed.]

Esox Lucius.
Salmo Trutta.
— *Umbla.*
Anguilla acutirostris.

Those found in Lough Neagh, and not in Lake Geneva, are,

Gasterosteus aculeatus.
— *pungitius.*
Abramis Brama.
Salmo Salar.
— *Eriox.*
— *Fario.*
— *ferox.*
Coregonus pollan.
Anguilla latirostris.
— *mediorostris.*
Petromyzon marinus.
— *fluviatilis.*
— *Planeri.*
Ammocœtes branchialis.

Those obtained in the Lake of Geneva, and not in Lough Neagh, are,

Cottus gobio.
Cyprinus carpio.
— *tinca.*
— *jesses.*
— *rutilus.*
— *alburnus.*
— *jaculus.*
— *bipunctatus.*
— *phoxinus.*
Coregonus thymallus.
— *fera.*
— *hiemalis.*
Lota vulgaris.

Here we find the general result that might be anticipated from the geographical position of the two lakes, the more northern being the richer in species of the genus *Salmo;* the more southern in species of the *Cyprinidæ;* for it is well known that in continental Europe the *Salmonidæ* increase in number northward, and the *Cyprinidæ* southward.

The value of the fishes of the northern lake is vastly greater than that of the southern. The most striking difference in connexion with the species which are common to the two lakes is, that *eels*, which are rare at Geneva, are abundant at Lough Neagh. There are four fisheries at which they are taken in the autumn, on descending from the lake to the sea. The greatest of these fisheries is at Toome, where the waters of the lake are discharged into the river Bann. Here from 50 to 60 tons weight of eels are annually taken in the season. So many as 70,000 fish, varying from ½ lb. to 5 lbs. in weight, have been caught in one night. I have myself seen 10,000 taken. They are sold at the fishery at 2*d.* per lb.; but the greater portion of these is sent alive, in well-boats, to London, where they produce from 10*d.* to 1*s.* per lb. The only species of fish at Geneva, of which we have regular returns of the number captured, is the *Salmo Trutta*, and I regret that, owing to its being captured at L. Neagh

along with other species, returns of it cannot specially be given, for the sake of comparison. But as the *S. Trutta* is, with the exception of the char, the only *Salmo* inhabiting the Lake of Geneva, we may compare the trout of L. Neagh generally, exclusive of the salmon, with it.

By so doing we learn that the quantity obtained in the Irish lake is vastly greater than that of which we have returns in the Swiss one. We have no indication of the quantity taken throughout the lake. At a small bay, as it is called, of L. Neagh, 1½ ton weight of trout has been brought ashore by four boats in one day.*

Of the two species of *Coregonus* inhabiting the Lake of Geneva (*C. hiemalis*, and *C. fera*), we have no indication of the quantity taken of the former; immense numbers of the *C. fera* are said to be captured during the three summer months at various parts of the lake; they would appear to be taken only in trammel or set nets.

These will not take perhaps more than $\frac{1}{10}$ of what the draught-net will take; the latter is chiefly used in the fishery of the *Coregonus pollan* of L. Neagh. There are no positive returns of the quantity of *Coregoni* taken in either lake, but from the manner in which *C. fera* is mentioned, and the circumstance of the trammel-net being used, its numbers are, probably, not at all approximate to those of the L. Neagh species, which has occasionally been caught in quantities with which the herring alone will bear comparison. Often 10, and occasionally 12, one-horse carts filled with these fish (about 6000 fish to each cart) are brought from the lake to Belfast in one morning. As the *Pollan* is conveyed for sale to all the districts around the lake, from 20 to 30 cart-loads, or from 120,000 to 130,000 fish on the whole, may be said to be not uncommonly taken in the course of a fine autumnal evening or night.

The *salmon* I leave to the last, as but few are now taken in the lake itself, owing to the obstructions opposed to them in the river Bann, on their ascent from the sea. The numbers captured at the chief fishery, called the salmon-leap, at Coleraine, will indicate with what abundance they would overspread L. Neagh, were justice done to them. In the season of 1842, *i. e.* from February to the 12th of August, 13,590 salmon were taken here. In 1843, 21,660—and in 1844, 15,011.†

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* This weight in lbs. is not very much less than that taken of trout during the year 1802 at Geneva, both when descending the Rhine, and when the species was entering the lake. The number taken at Geneva in 1802 was 4055 lbs., and during the six subsequent years the average taken may, in round numbers, be said to be about double that taken at L. Neagh in this one instance. See Jurine on L. Geneva, p. 177.

† See Fishery Report, p. 34.

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